





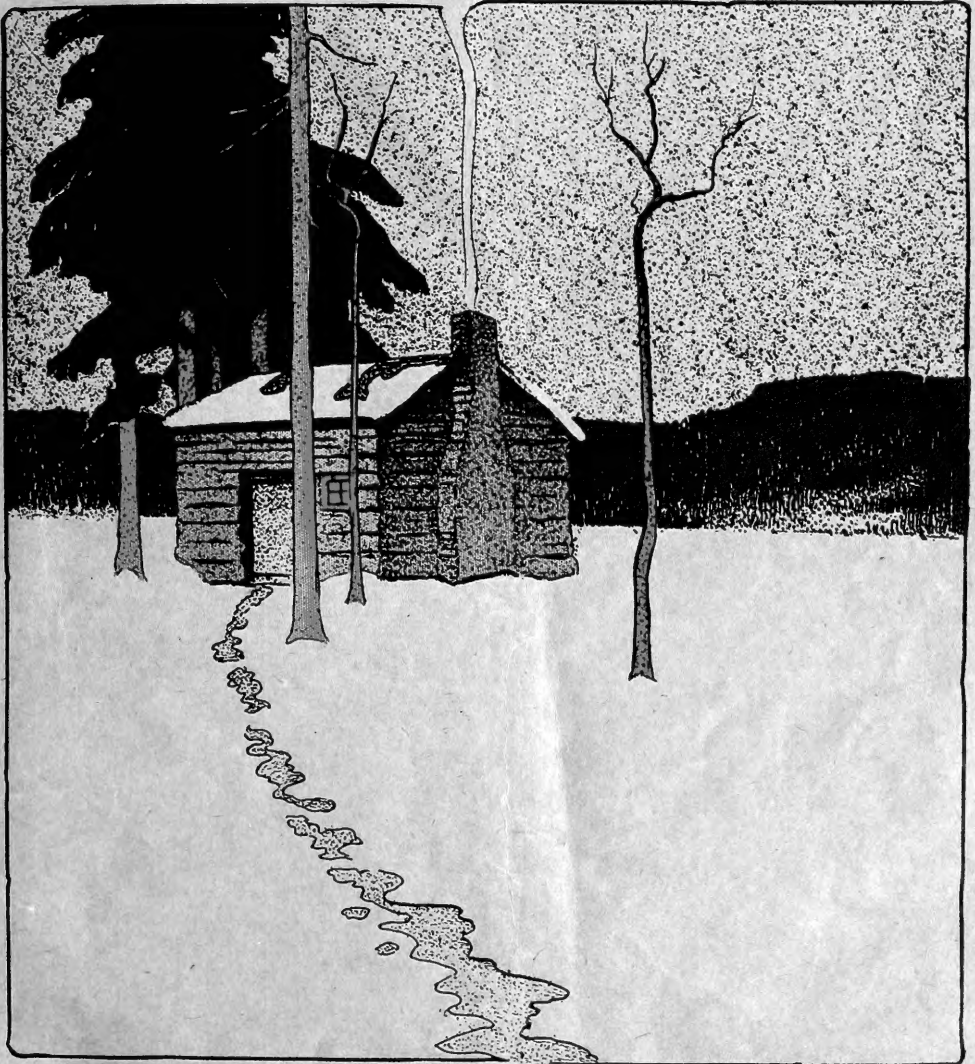


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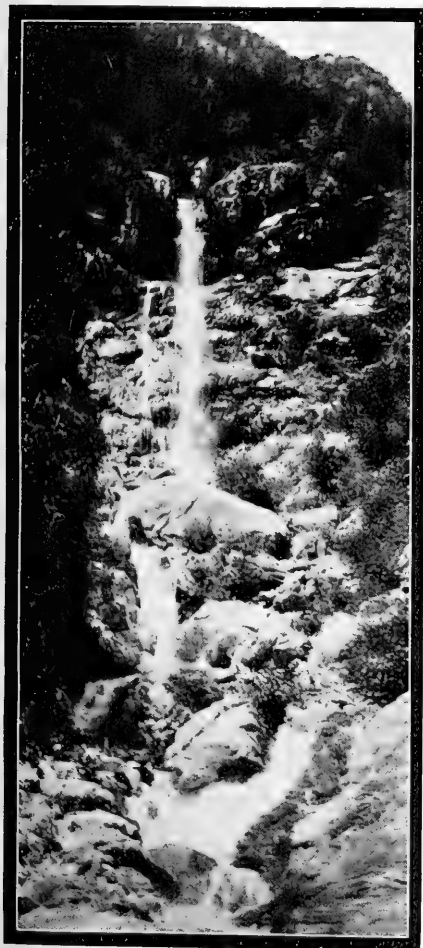
THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

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"A mighty tree, heir of the forest fair
Transported with its grace and verdure rare,

Star-crowned, it shone radiance divine
And linked the name of Christ with man in hearts ashine,
From lightning, harnessed to the will of man,
Came light and color to perfect the plan,
With art and nature wed to make it fair
The tree was bathed in beauty rich and rare:
One moment shimmering in glorious white
Then colors blending to the soul's delight.

I stood and gazed, my senses filled with joy,
No longer man, but in my heart a boy:
And then I turned, and from the darkness came
A picture of the war and mankind's shame,
I heard the cannonade, the clash of sword,
The awful shrieks that cursed the very Lord,
And then I cried, 'O Christ of Shining Star
Why is Thy peace, Thy power, Thy reign so far?'

I turned again, and blended in the tree,
I saw a vision of the world to be.
I saw the tree a wondrous tree of life
And men forgot their anguish and their strife.
The war no longer raged, and millions came
To take the leaves of healing in Christ's name.

Once more the sick were healed, the lame could dance
And weary men found solace in a glance."

AMERICAN FORESTRY

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JANUARY, 1919

NO. 301

VICTORY GARDENS!

BY CHARLES LATHROP PACK,
PRESIDENT, NATIONAL WAR GARDEN COMMISSION

WE'VE won the war! Now, keep it won and enjoy the fruits thereof. To do this is going to require continuing effort in order that what has been acquired may be stabilized. Careless relaxation may destroy some of the gains which have been secured.

Much that has been fought for and won with the precious blood of our best and bravest sons, may be lost unless great care is exerted to make the all-important reconstruction days on which we are now embarked and on whose uncharted seas we will be sailing for several years to come, as complete with patriotic effort and conscientious devotion to high duty as the war days through which we passed so bravely and so unflinchingly.

Twenty million tons of food to Europe in 1919! That is the task which has been assigned to the United States as a result of Mr. Hoover's promise to our Allies and the other nations abroad. He knew when he said the word it would be carried out. He knew the American people, what they have done and what they would do.

It is a big order but it will be filled; there is no doubt of that. When that amount was fixed it was the result of careful study of the minimum requirements of America's Allies and the neutrals who are necessarily dependent on this country for a large part of their food supply. Twenty million tons is not all they need, but it is the least amount that will meet their requirements. It was figured out that the American

people without any undue restrictions, without denying themselves to the point of privation, could easily furnish that quantity. It would be well to make it greater if possible, for it would prevent that much more hunger, suffering and starvation in Europe and Asia. It will be

impossible to prevent a certain amount of starvation. This pitiful toll cannot be prevented. Before sufficient quantities of food can be supplied to them from the present diminished granaries of the world, thousands of wretched people who have been near the point of starvation for the past three or four years, will actually have died for lack of food.

The task of America is to reduce this suffering and death to a minimum. Conservation of food will help. But the big problem is to produce. There can be no conservation when there is no production. The war gardeners of the United States have made a wonderful record during the past two years. They can always look back proudly to what they did in the way of increasing the nation's food supplies.

Now they are called on for an even greater task. This phrase, "an even greater task," is used advisedly. There are several reasons why it is true, why

the Victory Gardens of 1919, as the home food producers will now be known, have their biggest year ahead. War gardening has been an evolution, a development. The War Garden was the chrysalis. The Victory Garden is the butterfly. It would be very easy to permit a let

The Fruits of Victory



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**Write for Free Book to
National War Garden Commission
Washington, D. C.**

Charles Lathrop Pack, President

P. S. Ridsdale, Secretary

down, in the days of victory, in fact there is grave danger that there will be one. When the "shouting and the tumult die," when the cannon have ceased to roar and when victory is assured, it is so easy to say: "Now we can rest; we have fought and won; there is nothing more to do."

But there must be no slackening. Relaxation may mean ruin. Much of the good that has been wrought may be lost; indeed, worse days may come, days of world-wide pestilence, anarchy and social wreck if famine is allowed to sweep unchecked through the nations. That is why it is more important than ever to keep up the good work, to make the "Victory Gardens" of this year and the next and the next even more numerous, more flourishing, more helpful to this nation and to humanity as a whole, than were the War Gardens of 1917 and 1918. It can be done. I firmly believe that the American people can do greater things than they have ever done before. I am not mistaken about their character and their determination. There were 5,285,000 War Gardens in 1918. Why not make it 10,000,000 in 1919? Let us show the world that we are no "quitters." It's harder to work for something that seems to be accomplished than while the fight is on.

There is, however, another war in progress right now. It is not visible through the marching of soldiers, the bold array of battleships and the reverberation of guns and cannon. But silently, like a thief in the night, the grim monster Hunger is leading his cohorts through the world. Like invisible phantoms, wraiths of the dead, these troops march through town, village and countryside, cutting down women, children and strong men. This is the kind of war in which the world is now engaged. It is the world war for food. It will not be over this year, but it will

last for a number of years, five or ten at least. That is why effort must be made to produce every bit of food possible.

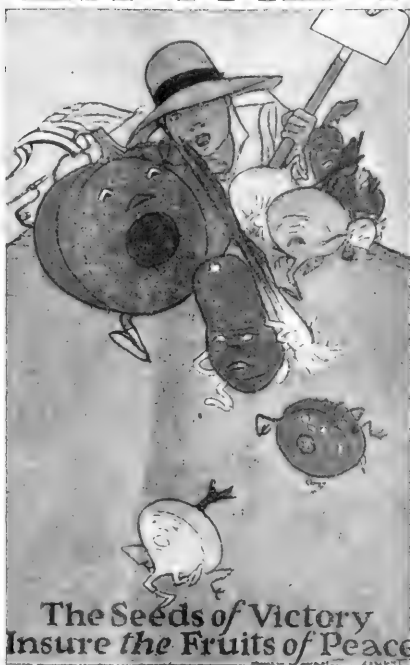
In spite of the fact that there was such marvelous response by the home food growers of the United States last year and that they rounded up the "slack land" in fine shape, letting very little of it escape, it is believed there can be even greater results. This applies both to numbers and to average production. With the training and the experience they have gained during the past two years it is certain that a majority of the "city farmers"

will be able to raise more beans and tomatoes and cabbage than they have heretofore. And as to the number of gardens—that figure, too, should be increased. All that is necessary is for the people in any particular locality to say: "We had 5,000 gardens last year; we'll make it 8,000 or 10,000 in 1919." Every community doubtless will find a certain number of lots which were not cultivated last year. There were some back yards and a few plots which escaped the general round-up. The thing to do is to get them all into the Victory Garden "draft" of 1919. If every city, town and village will make up its mind to work a little harder in 1919 than in 1918, the thing will be done; and after it is over the ease with which it was accomplished will surprise

everybody. For instance, Boston set out last spring with the idea that it could reach a mark of at least 15,000 War Gardens. When the count was made it was found there were more than 30,000. There were many similar experiences. That shows that any place can "surpass itself" if it determines to do so.

Plans have been made by the National War Garden Commission for a bigger and more intensive campaign this year than was carried on last season. In order that

WAR GARDENS OVER THE TOP



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FOR FREE BOOKS WRITE TO NATIONAL WAR GARDEN COMMISSION
WASHINGTON, D.C.

Charles Lathrop Pack, President

Percival S. Ridsdale, Secretary

results be obtained it is necessary to continue the preaching of the lesson of food need. It is only by keeping the thought constantly before the minds of the people that they can be impressed sufficiently with the importance of the work. They must be reminded again and again, "lest they forget." In the press of other work, in the welcoming back of our soldiers—who deserve every tribute that can be paid them—and in the vast business of reconstruction now occupying so much thought, it is essential to keep the home food production idea to the fore. This is being done. Everybody is urged to co-operate.

With plenty of time in which to prepare and with the experience of the past two years as a guide, the National War Garden Commission already has gone far in getting ready for its 1919 campaign. Thousands of posters have already been sent out, especially through the South where garden planting is under way at the time of this writing. Garden books also have been sent out in considerable quantities, as well as several series of short daily garden lessons for the southern papers, to be printed by them for the benefit of their readers. Soon the work will be in full swing throughout the entire country.

Several handsome new posters have been prepared by the Commission and will be used in this year's campaign, along with the beautiful and striking "Sow the Seeds of Victory" poster by James Montgomery Flagg which inspired so many home food producers and attracted so much favorable comment last year. The new designs, one of them entitled "War Gardens Over the Top," and the other, "War Gardens Victorious," are the work of the well-known artist, Maginel Wright Enright. They show the Victory Gardener leading his vegetables on to the conquest of the new world enemy, General Hunger. Instead of a "muni-

tion plant," this year it will be: "Every Garden a Peace Plant." The gardening books to be distributed by the Commission this year, the majority of them already off the press and ready for shipment as called for, are of more attractive and durable form than last year. Improvements have been made in the contents of the book, and they have heavy covers with the Flagg poster on the front in colors.

One of the Commission's representatives, Everett H. Kelley, is now on a tour of the country which has taken him through a large part of the South and will carry him

on to the Pacific Coast, up into the Northwest and all through the Central West. In urging the importance of greater food production "F. O. B. the Kitchen Door," he is conferring with various officials and committees in the cities and towns he visits; and he is illustrating what was done last year by moving pictures which he carries with him showing war gardeners at work. He is accompanied by Mrs. Kelley, who is helping to spread the message. Several other representatives of the Commission will start on tours of the northern parts of the United States in the near future.

Among those who will take an active part this year in stirring up Victory Gardening are the agricultural agents of the United States Railroad Administration. J. L. Ed-

wards, who is in general charge of this branch of the service, has called on the regional directors and the supervisors of agriculture of the different lines, to give this work their careful attention; and as a result the agents are making extensive plans for aggressive work and showing much enthusiasm. Typical of letters received by the Commission is that from B. F. Bush, regional director, Southwestern Region, who says: "I wish to state that the railroads in the Southwestern Region will again

War Gardens Victorious



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Every War Garden a Peace Plant—

—Charles Lathrop Pack, President.

NATIONAL WAR GARDEN COMMISSION

WASHINGTON, D.C.

do everything they possibly can in permitting their right-of-way and other station grounds to be used for farming and agricultural purposes;" and from N. D. Maher, regional director, Pocahontas Region, who says: "We will have our agricultural agents co-operate with you in connection with spreading the message of Food F. O. B. the Kitchen Door. There is no doubt that, with all the people to be fed in Europe, the Victory Gardens are as important as the War Gardens." Mr. Kelley is interviewing a number of these officials and arranging plans for further co-operation. The railroads actively supported the War Garden campaign; they will assist equally the Victory Garden campaign.

P. S. Ridsdale, secretary of the Commission, has just been in England attending a War Garden conference with food officials there. While the purpose of his trip to Europe was primarily in the interests of the American Forestry Association, he took occasion to visit the British Isles to offer continued co-operation on the part of the National War Garden Commission in the work of home food production which they are doing abroad. At the same time he has been investigating

methods employed there, particularly relating to gardening by the wounded and recuperating soldiers around hospitals. It is believed that much can be accomplished along that line in the United States this year. Just as it did last year, the Commission again in 1919 will offer

any assistance it can render to foreign countries in stimulating city farming.

That they are recognizing everywhere the greater need there will be for food in 1919, and that preparations are being made for the campaign, is shown by numerous reports to the Commission. The signing of the armistice did not stop the requests Register Webster, of Brooklyn, was receiving for garden permits for next season; and he already had granted more than a thousand such permits. Only one person who had given consent for the use of his land, he says, has withdrawn such permission because the war is over. "Everybody seems to understand," says Mr. Webster, "that the food situation



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LIBERTY SOWING the SEEDS of VICTORY

will be just as acute next year and the applications for War Gardens are pouring in just as steadily as if the war were still on." The value of gardening will be emphasized this year in connection with the "Own a Home"

Victory Edition 1919

HOME CANNING & DRYING of Vegetables & Fruits



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Washington, D.C.

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THE KAISER IS CANNED—CAN F

idea which real estate dealers all over the United States are taking up and preparing to push with all vigor now that building operations can go forward with increased speed.

That many cities and towns are alive to the needs of the future and the demands for service that will be made upon them, is evidenced by reports which the Commission has been receiving during the past month or so. They are asking for advice as to the plans for the coming year; and in many cases state that they have been busy during the fall and winter in going over their experiences, comparing notes and trying to discover where they have made mistakes and how they can correct them this year so as to improve on their past record. Here is a letter from Urbana, Illinois:

"We have already begun to make plans and get ready for another year. We have a feeling here that the garden should be placed upon a

permanent basis for educational and community purposes and should be made the concrete and objective means of encouraging health, thrift and industry. We have established central offices or headquarters and are now"—this letter was written November 25—"holding frequent meetings and gaining much useful knowledge from an exchange of experiences. The women have taken great interest in the work.

"Personally I have great faith in the influence of the garden as a means of social unity. It should form the foundation for close community organization which should make for individual and local efficiency. This in turn makes for individual prosperity and happiness and means state and national efficiency. The garden with related topics of health and industry appeals to everyone. I vote with both hands to keep and prosper the garden while we have it and so extend and enlarge its scope and vision of usefulness as to make it the means of that

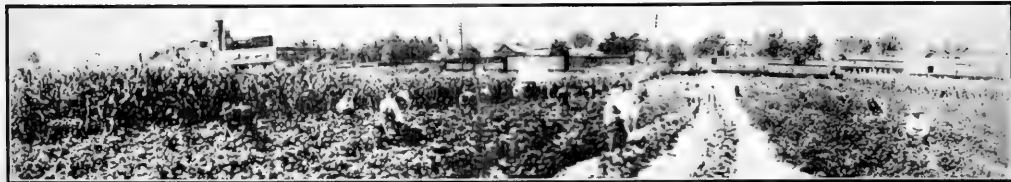
Victory Edition 1919

WAR GARDENING and Home Storage of Vegetables



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social unity that will mean better life for everyone."

Now if everybody else will "vote with both hands" to continue the garden movement and make it a permanent



THE PARADERS

institution, the problem will be solved. We will have the 10,000,000 Victory Gardens for which we hope. What that will mean to the world cannot be told! It will be impossible to determine the number of lives that may be saved, the suffering and deprivation that will be avoided and the happiness and joy that will come to thousands upon thousands of poor people abroad whose daily bread is of meager quantity and wretched quality. Reports have told how the Ameri-

more than any other nation to hold in check and finally crush altogether the terrible foe, Hunger. Mr. Hoover has said there will be seven years of world food shortage. This must be reduced, if possible.

Let the Victory Gardeners now line up! Let them see this war through to a glorious conclusion. Let their motto be: "We have just begun to fight." That speaks the true spirit of America. That was the impulse which sent the boys through at Cantigny and at Chateau Thierry, at St. Mihiel and in the bloody Argonne. The memory of these deeds must be an incentive and an inspiration to every man, woman and

child in the United States. There can be no finer tribute to the nation's heroes than to make real and lasting the victories for which they died.



can soldiers as they passed through some of the war-racked villages of northern France and Belgium, took

little children upon their knees and shared their rations with them, and of the light which shone upon the thin, sad faces at this act of mercy. The American soldier typifies the United States. This country must now help to feed the world. Uncle Sam has become the Joseph of the Modern World. He must try to stave off the "seven lean years." We alone can do

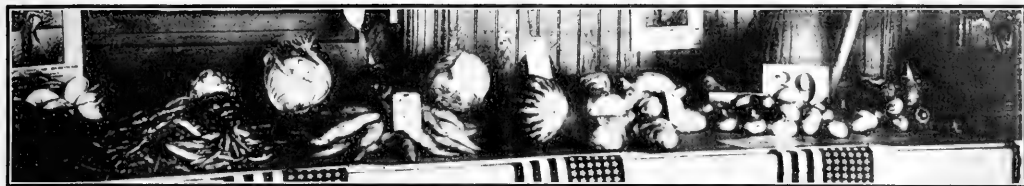


become the Joseph of the Modern World. He must try to stave off the "seven lean years." We alone can do

In a sense every home garden planted in 1919 will be a monument to the American fighter and to the service he performed in helping to establish firmly for the benefit of all mankind the undying principles of Liberty, Truth and Justice. Every individual, every organization, every community that encourages others or actively

child in the United States. There can be no finer tribute to the nation's heroes than to make real and lasting the victories for which they died.





assists in increasing home food production in the United States this year, can feel that it is an act of the truest and deepest humanity.

Said a recent dispatch from the other side: "The enthusiasm in the first flush of allied victory is now giving way to a realization of the appalling conditions and the actual needs of the millions in Belgium and northern France."

Anxiety over the food situation was said to be paramount. That is the question which is of first importance. Once it is solved, other economic and social problems in connection with re-

construction will be well on the way to taking care of themselves. One of the finest and most inspiring slogans which helped the American Army in the carrying through of some apparently impossible war tasks was—"It can't be done. We'll do it." Put that into effect in the home food campaign of 1919.

All the world—that is, all the world worth mentioning—loves a winner. That is why they praise and honor the men who "do things." Is it worth trying to reach that goal of 10,000,000 Victory Gardens? "It can't be done? Let's do it!"



Prize winning exhibit of the Trinity Methodist Church Canning Club at Meriden, Connecticut. This display scored 93 out of a possible 100 points.



This blue-ribbon entry won the National Capitol Prize Certificate offered by the National War Garden Commission; also a prize from the local chamber of commerce.

UNDER THE SUPERVISION OF SIDNEY A. EDWARDS, AGRICULTURAL AGENT OF THE CHAMBER OF COMMERCE, MERIDEN, HAD ONE OF THE LIVELIEST WAR GARDEN AND CANNING CAMPAIGNS IN THE COUNTRY. IN ITS WAR GARDENS THE CITY RAISED ABOUT \$100,000 WORTH OF ITS OWN FOOD. THIS MEANT MUCH IN A CONGESTED MANUFACTURING DISTRICT.

ROOSEVELT THE CONSERVATIONIST

Theodore Roosevelt is dead, but his spirit, his example, live after him, and will ever be a strong influence for better individual and national life. We have lost a great leader in a crisis in the nation's life, a leader who always placed the people's interests before all others, a leader who defended his country, arms in hand in war, freely offering his life, as have his sons in this war and as he himself tried to do. His death at this time is a national calamity, depriving the nation of his wise counsel, his conscientious and courageous leadership, which feared nothing so much as wrong or failure to do his duty. His life, his ideals, his accomplishments will always be an inspiration to those who see in service to humanity, in unselfish endeavor and in duty done, life's best reward.

His voice is silent, but his influence for good lives on. His spirit will march in the van of our armies in war, and in peace it will strengthen our righteous efforts.

True patriot, model citizen, devoted husband and father, wise leader, best type of American, such was Theodore Roosevelt—the world can ill spare him.—Leonard Wood.

CONSERVATION never had a truer friend, a more hearty advocate and a stronger supporter than Theodore Roosevelt. It was he who gave the movement the great impelling force which placed it in the forefront of the nation's big problems. Through his wise foresight in recognizing the vital importance of this subject and his energy in furthering discussion of the question, conservation became what it deserved to be, one of the leading thoughts in the mind of the entire nation.

It was through the first historic Conference of Governors called by President Roosevelt in May, 1908, that there was brought into existence the first concentrated and nation-wide effort to place the conservation movement in the important position which it has occupied ever since. This conference gave dynamic and concrete being and national life to a topic which had been discussed for some years previously. The powerful personality of President Roosevelt and his strong endorsement and virile utterances gave to the conservation movement a firm place among the problems with which the nation had to grapple.

In his address at the opening of the First Conference of Governors, President Roosevelt said: "The prosperity of our people depends directly on the energy and intelligence with which our natural resources are used. It is equally clear that these resources are the final basis of national power and perpetuity. Finally, it is ominously evident that these resources are in the course of rapid exhaustion." Further he said: "Flood prevention, water power development, preservation of



Theodore Roosevelt

We shall recall him as "that tower of strength
That stood four-square to all the winds that blew."

the soil and improvement of navigable rivers are all promoted by a policy of forest conservation." Again expressing himself on this vital theme, he said: "The preservation of the forests is vital to the welfare of every country. China and the Mediterranean countries offer examples of the terrible effect of deforestation." In numerous speeches and in messages to Congress he did not fail to impress strongly upon the people of the United States the need for the future prosperity and well-being of the country of adopting measures looking to proper saving along with proper utilization of all natural resources.

It is eminently fitting, therefore, not only that the memory of what Mr. Roosevelt has done in arousing the thought of the country on this subject should be honored, but that there should be some concrete and lasting evidence expressive of the nation's gratitude for his services to mankind in this direction. It has been proposed by the American Forestry Association of which organization Mr. Roosevelt was formerly vice-president, that this take the form of nation-wide planting of memorial trees and the naming of a great national highway in honor of Theodore Roosevelt. He did more than any

other man to perpetuate the forests of America. In speaking of this tribute to the great conservationist, Charles Lathrop Pack, president of the Association, said:

"No finer tribute can be paid the man who did so much to awaken the country to the value of our national resources. Knowing him as I did, I know he would approve most heartily of the planting of memorial trees—a living lesson of that which he sought to teach."

Trees for Memorials

JUST the other day Mrs. Louis Boex of Cincinnati planted a silver maple in honor of her son Louis, who was a gunner on the *Ticonderoga*. The state of Indiana is urging memorial groves in each of her ninety-two counties. The state forester of Massachusetts suggests that memorial forests be planted. Another plan urges the employment of returning soldiers in planting such forests. Thus has the suggestion by the American Forestry Association that memorial trees be planted in honor of the sailors and soldiers, who gave their lives in the battle against autocracy, taken hold of the public mind. The newspapers are taking up the idea in editorials urging planting of memorial trees.

It is the aim of the American Forestry Association to register all such trees planted in order that a record may be kept for another generation and it is requested that members of the association keep the officers informed of any such activities. The members of the association have a fine opportunity to bring forestry to the fuller attention of the American public by means of this campaign and it is urged that each member place before any local memorial committee the suggestion that memorial trees be planted. Suggest that the committee call upon the state or city forester for advice, and keep the American Forestry Association informed of any developments and plans for planting.

Plans for memorial tree planting take many forms. In Indiana Richard Lieber, the secretary of the Board of Forestry, at the suggestion of Governor Goodrich, proposes to let each county decide the size of its own grove to the memory of their boys. Representatives from these counties will be urged to form a state organization, appoint an executive committee and with the assistance of artists and park experts lay down general principles of

beauty, symmetry and expression to the groves.

From Kansas comes the heartiest indorsement of the memorial tree plan by Governor Capper. He has turned the suggestion over to the new administration with the hope that Arbor Day in Kansas be the banner one in the state's history by the planting of memorial trees along the motor highways crossing that state. The Lincoln Highway has big plans under way in co-operation with the General Federation of Women's Clubs for the planting of memorial trees along that route. In Louisiana "Victory Oaks" are to be planted along the Jefferson Highway and the American Forestry Association is getting letters every day from state and city foresters urging planting along similar motor routes.

The opportunity to beautify the cities is one of the big phases growing out of the memorial tree idea. In St. Louis Park Commissioner Cunliff will plant memorial trees along each side of the famous Lindell Boulevard. In Kansas City a group plan memorial is being discussed which offers a fine opportunity for the planting of memorial trees. In Baltimore discussion is on for a memorial in Mt. Vernon Place that will include avenues and drives with proper tree planting. Philadelphia is discussing a boulevard connecting the University of Pennsylvania and Fairmount Park. Such plans as these of course include fine memorial buildings and arches, but everywhere the conviction is growing that trees as memorials should be incorporated in the plans.

Another suggestion that has come to the American Forestry Association is the one for making the Community Christmas Trees permanent, rather than

a new tree every year. C. P. Wilbur, acting state forester of New Jersey, informs the association that there is a permanent tree at Morristown, N. J., in the city park. It would appear that here is a good suggestion for every



AS IF A GUARD OF HONOR

The trees at the foot of the hill upon which stands the most famous monument in the world.

member of the association to work on in his own locality. The permanent tree would, if properly placed and cared for, prove a wonderful inspiration the year around. Alfred Gaskill, the state forester of New Jersey, urges the organization of community units to plant memorial trees in park, public square or school yard. The suggestion has been made by Mrs. John Dickinson Sherman of the General Federation of Women's Clubs that the school children of Chicago plant memorial trees in honor of Mrs. Ella Flagg Young. This suggestion can be taken up by other communities who wish to honor educators in a similar way. J. S. Holmes, the state forester of North Carolina informs the association that the General Federation of Women's Clubs in that state has planted "Pershing" and "Liberty" oaks and that the tree planting idea is being taken up by the schools. F. W. Besley, the state forester of Maryland, has a forward going plan which includes the planting of trees in honor of children, thus the tree becomes an object of great interest to the growing child and he comes to take the greatest care of the tree.

Frank William Rane, the state forester of Massachusetts, is urging memorial forests. He points to the fact that there are millions of acres in the country waiting for just such noble endeavor and he suggests that the returning soldiers be employed in this great work. In Oakland a "Victory Park" is being discussed and M. B. Pratt, the deputy state forester of California suggests memorial trees in the municipal auto parking areas that are being established all over the state.

The college campus offers a fine setting for memorial trees and the suggestion has been made that the "old grads" get together and plant trees for the men who answered the call of their country. The elms at Yale, for instance are famous. Every Oberlin man and woman knows Tappan Walk and the famous elm at the corner of the campus of that Ohio college. To enumerate trees with a history would go beyond all space bounds but

some of those most widely known are the elm in whose shade William Penn made his treaty with the Indians; the Charter Oak in Massachusetts; the palmettoes of Charleston, S. C.; the cypress trees at the Jumel mansion in New York City; the Washington Elm at Cambridge; the pin oak trees in Mount Vernon Place, Baltimore, dedicated to eight Maryland men on Washington's staff. More recent plantings have been the 150 Liberty Oaks at Liberty Heights just outside Westminster, Maryland, set by high school boys for the Women's Civic League of Westminster.

State Forester Besley believes this is the first memorial tree planting on such a scale, the trees being distributed along a mile of the road. Look for the opportunity in your city; picture to your fellow-citizens the beauties of forestry and urge the planting of trees in connection with any memorial adopted. Well may we consider France for as Richard Lieber, secretary of the Indiana Board of Forestry, says:

"The Argonne Forest stands as a huge memorial grove to the memory of American and Allied heroes. The Argonne is also a symbol of what a forest will do in war and in time of national peril. Trees are man's best friend.

"Stone and bronze monuments may be heroic and military, they are more often vainly gloriously dynastic in purpose. A monument of trees in a well ordered grove is human and humane; it speaks the language of freemen. It is full of solace and hope to the bereaved. As a living and a breathing thing it speaks of victory over death. It is expressive of thanks and devotion by the



A LIVING MEMORIAL

Mrs. Louis Boex is placing the last spadeful of earth around the roots of a silver maple tree—a memorial for her son, Louis Boex, gunner on the Ticonderoga, who lost his life when he was answering the shell-fire of a submarine which afterwards sank the troop ship.

people to its heroes, dead and living."

The appeal of the living, growing tree is universal and the American Forestry Association finds that hundreds of organizations are eager to furnish the plan. One of the most recent indorsements of the plan came from the Women's Association of Commerce with headquarters in Chicago and another from the Woman's National

Association of Commerce with headquarters in Chicago and another from the Woman's National



WITH TREES FOR A BACKGROUND

The trees about the famed Bartholdi Fountain in the Botanical Garden at Washington prove without shadow of a doubt that trees are the proper setting for any memorial.

Farm and Garden Association with headquarters in New York City. Everyone sees the coming of the city beautiful in plans for memorials. The tree will have a prominent place in such plans and presents an opportunity for a growing interest in the beauties of forestry. In this work the members of the American Forestry Association have a big part—the great opportunity in fact to interest every organization to which they belong in the value of forestry in general. We all know the

devastation in France that has been pictured to us during the war. The authorities agree that the forests of France kept the Hun from reaching Paris. That should be a great lesson to any country. In our trees lie a great strength; in memorial trees in honor of our soldiers and sailors, whether they lost their lives or not, is a great object lesson as well as a lasting and fitting memorial to those who fought against autocracy.

CARE FOR THE BIRDS IN WINTER

THE *American City* publishes an interesting letter from Ernst Strehle, Park Superintendent of St. Louis, in which he says that a systematic effort has been made to care for their native birds during the winter for the past two years. Continuing Mr. Strehle says:

"So successful has the experiment proved, that we expect to extend the work to all St. Louis parks this winter.

"Feeding stations were established at numerous places throughout the park, and the work of feeding was turned over to one of the employes of the park, who had previously received the proper instructions as to procedure. The food consisted of grains and other seeds, bread and meat, the total amount of food used being about 200 pounds per week throughout the entire winter.

"The following approximate number of birds were regular guests at the feeding stations: Two hundred quail, 50 blue jays, 100 red-headed woodpeckers, 30 three-toed woodpeckers, 100 flickers, 30 winter wrens, 70 brown creepers, 30 red-breasted nuthatches, 150 black-capped chickadees and 30 red birds. Several hundred gray squirrels also took advantage of this opportunity to get food easily.

"About 700 bird boxes, made by the children of the manual training classes of the St. Louis public schools, were distributed and hung in the various parks, under

the supervision of the Park Superintendent, often in the presence of the children who made them. These boxes were made according to the specifications issued by the United States Biological Survey.

"No one can accurately estimate the value of this work, but there can be no doubt that if these birds had not been fed and protected in this way the unusual severity of last winter would have forced them to migrate further south or would have killed them outright. Their loss to Forest Park would have been serious, as they are of considerable value in checking the development of insect life in the park, to say nothing of the pleasure they give to the persons who visit the park during the winter.

"The woodpeckers, for example, or the creepers and nuthatches, whose food in winter consists largely of eggs, pupae and larvae of insects which hibernate in the bark and wood of trees, will demonstrate in a very short time to anyone who will stop to watch them why it is worth while to induce them to remain in a climate otherwise too severe for them. The red bird, and many others likewise, ordinarily seek a sheltered ravine in the deep woods, and seldom winter in the city unless specially induced to stay. With the possible exception of the blue jay, all the birds mentioned have a decided economic value that is many times greater than the cost of feeding and caring for them during the severest winter."

USES OF THE BRAZIL-NUT TREE

BY C. H. PEARSON

THE Brazil-nut tree, called in botanical language, *Bertholletia excelsa*, is one of the most remarkable plants belonging to the monkey pot family. It forms a lofty tree with spreading branches and with a thick rough bark. Its stem averages a hundred feet in height and from two to four feet in diameter. The branches do not appear until near the top where they extend outward and upward in an irregular fashion as shown in the illustration. Its leaves are undivided, arranged alternately upon the branches, about two feet long and from five to six inches wide of a brilliant green. The flowers are yellowish white, more or less inconspicuous, and the fruit, which is produced in the upper branches, is a massive, round, hard-shelled pod from four to six inches in diameter.

This gigantic tree in the South American forests forms immense stretches of forests along the Amazon and Rio Negro rivers, and likewise about Esmeraldas on the Orinoco. The range of the Brazil-nut tree is not well-known, but it is one of a kind very extensive in the country, i. e., those of which both the timber and the fruit are largely available. The majority of the timber trees of Brazil do not yield fruit eaten by man; while the majority of their fruits are obtained from plants not yielding available timber. The Brazil-nut tree affords in its lumber, its fruit, and its bark many useful products which attract our attention.

The wood obtained from the Brazil-nut is highly esteemed in Brazil for building and naval construction and for works exposed to the soil and air. It is hard, heavy, strong and tough and splits with a straight, clean fracture though not so easily as a good many other woods of equal weight and hardness. The wood has a long fiber and is noted for its toughness and durability. It is light brown, tinged with red and turns slightly

darker with age. Considering its hardness the wood works well and takes a very good polish, which it retains. There is an almost inexhaustible supply of this wood and the large forests have scarcely been touched with an ax.

As described above, the fruit of the Brazil-nut tree is an excessively hard-shelled pod which contains from

eighteen to twenty-four edible seeds, so beautifully packed in the shell that when once removed it is impossible to replace them. Although they are called nuts they are not nuts in the botanical sense; in the trade they are generally so considered. Brazil, Para and cream nuts are a few of the more common trade designations. Originally these seeds were exported chiefly from Para, and, therefore, came to be called Para nuts. In Venezuela both the trees and the nuts are called *juvia* and in Brazil the Portuguese name for the seeds is *castanheiro* or *castanheiro do Para*. This name has been corrupted to *castanha*, meaning nut, and the term *castanha*, means nut orchard.

The gathering of these seeds is an important industry in Brazil. Mr. C. F. Carter in the December issue of the South American, gives a very interesting description of the manner of gathering



A SMALL CLUMP OF BRAZIL NUT TREES

This tree averages a hundred feet in height of stem, and two to four feet in diameter. It is most useful, for its lumber, fruit and even bark yield valuable commercial products.

the seeds. He says:

"Early in January, the harvesting parties set out to gather the crop. As the only means of transportation in North Brazil is by water, these parties travel in canoes up the smaller tributaries to the castanahls. Arrived there, the pods are assembled at the foot of the trees, and broken open with the machete, after which the nuts are carried in baskets to the canoes which, when loaded, are taken down the small streams to the larger rivers navigable by steamboats. As the river steamers are unable either to maintain regular schedules or await the arrival of gathering parties with

nuts it is necessary that the nuts be left on the river bank in what are known as "paioes." These paioes consist of cleared spaces protected from the hot sun and tropical rains by palm leaf shelters. However, these paioes are inadequate and, in consequence, the nuts sustain more or less injury at this stage, according to the length of time they remain in the paioes.

In a few districts, the custom of washing the nuts prevails. The method now in vogue is the same as was employed generations ago. In these districts, when the canoes arrive from the castanhais, the nuts are transferred from the smaller boats in small wicker baskets



Courtesy the South American

LOADING THE NUTS ON SMALL BOATS

The only means of transportation in North Brazil is by water and so the harvesting parties travel in canoes to the castanhais, or orchards, where the nuts are carried to the canoes in baskets for loading.

which are immersed in the stream several times. By this process the accumulated dirt is washed off and imperfect nuts rise to the surface and float away. The cleaned nuts are passed on to the larger canoes or lighters and are later transferred to the river steamers for transport to Manaus and Para."

These so-called Brazil nuts are well-known in the American markets and are highly esteemed for their oily almond-flavored interior. They are a luxury in some countries and an article of food in another. They are used either to obtain an oil or are eaten in the raw state or are otherwise prepared as an article of food. About the end of December the seeds are in the fit state to be eaten raw;



Courtesy the South American

NATIVES BUSY TAKING OFF BRAZIL NUT CARGO

The cargoes of nuts are brought down the small streams of North Brazil in canoes to the larger rivers, which are navigable by steamboats and which carry the nuts to market. The industry is an active, profitable and most important one in Brazil.



Courtesy the South American

UNLOADING BRAZIL NUTS

This shows the method of unloading the nuts by basket and depositing them on the river bank awaiting the arrival of the river steamers.

and they may be preserved for many months by storing them in a moderately dry place and out of reach of the hot sun or excessive moisture. The use of the seeds for procuring an oil is more extensive and important than is generally known. If they are kept dry the kernel soon easily separates from the hard shell of the seed. The seeds are then cracked with a small mallet or by means of machinery especially designed for this purpose without injuring the kernels. The sound kernels are next cleaned from every particle of shell and crushed for the purpose of obtaining the oil of which there is approximately 70 per cent. The oil obtained from the first pressing is of the best quality; it is clear and suitable for food and is sometimes used as a substitute for olive oil. It retains the taste of the kernel, which to some persons is very disagreeable. The oil is used also by watch makers and artists.

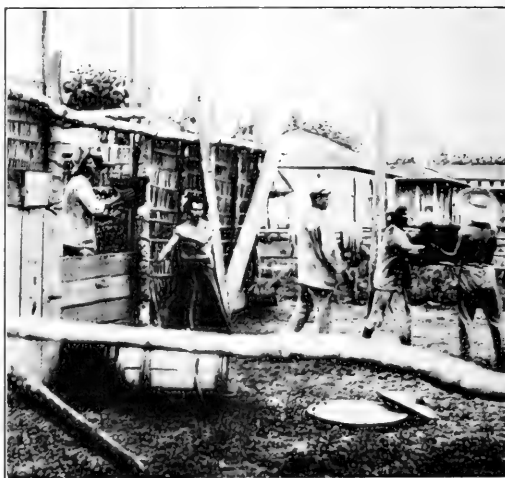
The bulk of the seeds coming into the United States are eaten. It has been estimated that about twenty per cent are shelled and used by confectioners for making various sorts of candied products. This latter use is rapidly increasing.

According to Mr. Carter the exports of Brazilian nuts from Para, Manaus, and Itacoatiara during the period from January 1st to June 30, 1915, amounted to 407,687 bushels. Of this total, 188,542 bushels were from Manaus, 38,117 bushels from Itacoatiara, and 181,028 bushels from Para. Manaus shipped 100,890 bushels to Europe and 87,652 to American ports, Itacoatiara 24,274 to

Europe and 13,843 to this side of the Atlantic, and the respective figures for Para were 87,496 and 93,532. The total exportation to Europe was 212,660, and to American ports, 195,027. The statistics of the Department of Commerce and Labor give the following amounts and values of the Brazil nuts imported into the United States from 1909 to 1914, inclusive:

Year	Amounts	Value
1909 (Bushels)	407,719	\$ 761,219
1910 "	461,496	1,251,738
1911 "	283,902	804,064
1912 (Pounds)	21,539,508	1,092,671
1913 "	11,933,445	668,534
1914 "	20,423,497	1,075,907

Another interesting product of the Brazil-nut tree is the bark.



Courtesy the South American

PLACING BRAZIL NUTS IN THE PAIOES

These paioes are shelters built of palm leaves on the river banks, in which the nuts are protected from the hot sun and tropical rains pending the arrival of the river steamers.

The inner portion of the bark is rather thick, very fibrous and of a dark brown or reddish color indicating the presence of tannin. It contains tannin in commercial quantities, but it is rarely used for this purpose because the bark is too valuable for making oakum used so extensively in Brazil for calking vessels.

A CABLEGRAM from France received from Secretary P. S. Ridsdale, of the American Forestry Association, just before this magazine went to press announced that the French Government has accepted the offer of aid in reforesting France made by the Association. Mr. Ridsdale, after visiting the devastated areas, will return to Washington, sailing from Liverpool February 5th, on the first available boat. Plans for gathering the seed for France will be completed upon his return.

THE POSSIBILITIES OF FARM WOODLAND DEVELOPMENT UNDER THE SMITH-LEVER ACT

BY C. R. TILLOTSON

ACCORDING to estimates made by crop reporters of the Bureau of Crop Estimates, United States Department of Agriculture in December, 1917, approximately 83,000,000 cords of firewood were used on the farms of the United States in the year 1917. The total value of this in round figures was \$283,000,000. A



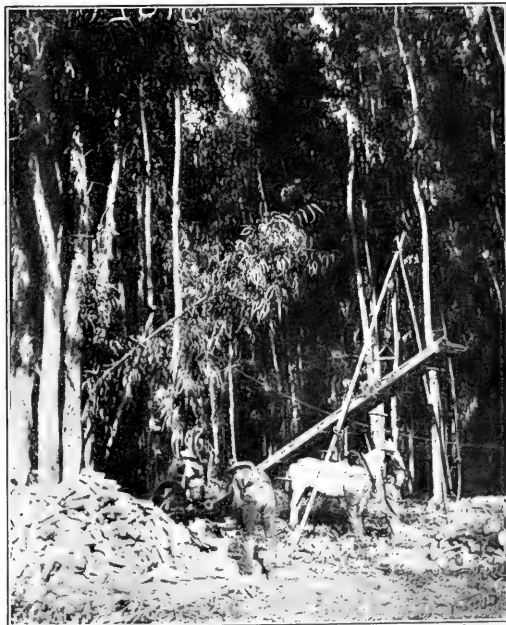
A WHITE OAK STAND

These trees are 25 years old, 2 to 5-inch diameter, 30 feet high. The stand is in excellent shape for a thinning of 2,000 to 2,500 per acre. Sprouted low. Grazing has been practiced. Brighton, Livingston County, Michigan.

similar estimate made in December, 1916, showed about 82,000,000 cords used in 1916, valued at \$225,426,000. These figures represent only the value of cordwood used on the farm. They do not include the value of other products, such as posts and poles used on the farm nor the cordwood and other material sold from the farm woodlands. With these taken into account, it seems reasonable that the total value of products cut from farm woodlands during each of these two years must have been from \$400,000,000 to \$500,000,000. Probably more often than not, moreover, the woodland owner through ignorance of values received less for his woodland products than they are worth. For the most part also farm woodlands are in poor condition and not producing as much

cordwood or other material as would be possible if they were properly cared for. It is apparent that even considered from the standpoint of a revenue producing crop only, farm woodlands are an asset of considerable national importance. The coal shortage experienced in several regions last winter has emphasized the fact that farm woodlands have a value other than that of being merely revenue producers. Many a farmer and community would have gone cold for a period last winter had it not been for cordwood cut from farm woodlands to meet the emergency of no coal. The same may perhaps be true next winter and then again at some future date. It is principally as a yearly crop, however, that wood deserves attention.

Wood produced in the farm woodlands is a farm crop and there is a continual need on the farm for it. As a crop it has attributes possessed to a like degree by no



ENGINE CUTTING WOOD

Saws whole trees up $\frac{1}{2}$ to 2 cords an hour. Santa Fe Springs, San Bernardino County, California.

other on the farm. It demands little care; will thrive on poor soil; naturally and continually regenerates itself, and is marketable at all seasons and at increasing values as it grows older and larger. In some regions wood is still the main crop of the farm and furnishes employment for

man and beast alike during winter months. The woodland serves as a protection to farm buildings, livestock, and crops and increases the sale value of the farm. These things entitle it to consideration at the hands of agriculturists and all others interested in better farming and better farm conditions in general.

A great and growing interest of late years been taken by the individual states and the nation in rural affairs. Through their agricultural colleges and experiment stations the states have been wrestling with local agricultural problems and sending useful information broadcast to farmers within their borders; the national government has also been helping agricultural affairs largely through the organization of the United States Department of Agriculture, but also through giving direct aid to State Agricultural Colleges in the form of Federal appropriations. A number of acts for this purpose have been passed from time to time, but the one known as the Smith-Lever Act, passed May 8, 1914, is proving to be more far-reaching in its effect than any of the others.

This bill provides for cooperative agricultural extension work between land grant agricultural colleges in the states and the United States Department of Agriculture, this work to consist of the giving of instruction and practical demonstrations to persons not attending or resident in these colleges and imparting to such persons information on these subjects through field demonstrations, publications, and otherwise. The work must be carried on in a manner mutually agreed upon by the Secretary of Agriculture and the colleges which receive the benefit of the act.

To pay the expenses of this work, \$480,000 is to be appropriated yearly from Federal funds; \$10,000 of this will be distributed to each state. An additional \$600,000, or a total of \$1,080,000, was appropriated for the fiscal year July 1, 1915, to June 30, 1916. For each year thereafter for seven years, the Act provides for an appropriation exceeding by \$500,000 that of the preceding year. Thereafter, there will be permanently appropriated each year in addition to the sum of \$480,000 the sum of \$4,100,000 to carry on this work. For the fiscal year July 1, 1918, to June 30, 1919, there will be appropriated \$2,580,000. To receive its due quota of the money ap-

propriated in any one year, the State must provide an equal amount either through an appropriation by the State Legislature or through "state, county, college, local authority, or individual contributions from within the State."

As stated in the Yearbook of the Department of Agriculture* for 1914, this is one of the most striking educational measures ever adopted by any government. The machinery for putting it into effect is already well developed, every State in the Union has agreed to its provisions, and already the State Agricultural Colleges and the United States Department of Agriculture are getting in closer touch with the agricultural population than has hitherto been possible. Through the employment at these colleges of experts in different lines, such as agronomy, animal husbandry, dairying, etc., many lines of work are already being carried on under the provisions of this law. The possibilities in this respect have been made more effective through the system of county agents in most States. These men, with headquarters usually at

the county seat, are in the employ of the Agricultural College. It is their business to assist farmers in agricultural matters. They are almost continually traveling from farm to farm in their counties and carrying information to the farmers. All of each State's activities supported by this Act are under the control of

the State Extension Director, who is also connected with the College, and before any projects for which the use of Smith-Lever funds are contemplated can be initiated, they must receive both his approval and that of the States Relation Service of the United States Department of Agriculture.

The significance of this bill and the organization of county agents which has arisen out of it to those interested in forestry and particularly in farm woodlands must be apparent. The importance of farm woodlands to their owners has already been pointed out. Why, then, should not they be given their due share of attention under the provisions of this law? The average woodland owner knows less about the handling and selling of his timber than about any other farm crop. The present big demand for cordwood is doubtless resulting in the needless slashing of many farm woodlands and will



PRODUCTS OF THE WOODLOT

A load of hackberry poles on public square for sale. They bring \$2.50 per load at Gallatin, Tennessee.

* Report of the Secretary, page 50, Yearbook of the Dept. of Agr., 1914.

destroy their future usefulness. Through expert advice upon how and what timber to cut from farm woodlands, great quantities of cordwood in the aggregate can be secured without damaging their productive capacity. The woodland lends itself very well to demonstrations of various kinds such as improvement cuttings, estimating timber, planting to secure windbreaks or better stands, efficient cutting and marketing of products, preservative treatment of fence posts, and a number of others. There is no question of the legality of such work under the terms of the bill. It has already had the approval of the States Relations Service of the United States Department of Agriculture, and Extension Directors in several States. There is apparently no reason why the farm woodland should not come in for attention and a great many reasons why it should. All that now needs to be done by those interested in this phase of agriculture is to impress upon the State Extension Director the immediate necessity for initiating such work, and assisting him to do it.

The best means of giving such work permanency and effectiveness appears to be for the agricultural colleges from which the extension work is directed to attach to their staffs for this particular purpose an expert in forestry. His position would be similar to that of an expert in dairying, for instance, who is attached for the purpose of improving the dairying conditions throughout the State. The forestry expert would be able to take advantage of the system of county agents and through them reach more people than through any plan in which he would have to work alone. There is little question but that through assistance given in the sale of woodlands products alone he would each year save to woodland owners in the State many times his salary. In teaching them how to care for their woodlands he would be making provision for future supplies of farm timber

and increasing the value of the farms. His duties would not interfere with those of the State Forester, and in most cases at least he would be welcomed and given as much assistance as possible by the State Forester. In several States, such experts have already been employed by the agricultural college.

Where in the opinion of the State Extension Director conditions do not at present warrant the employment of such a man, it may still be possible for the State Forest Service to carry on such work in co-operation with the State Extension Service of the College. At least two State foresters are already doing so with entirely satisfactory results. If a State Forester wishes to conduct work in line with provisions of the Smith-Lever Act and can allot for that purpose a certain amount of his appropriation to a project which will come under the direction of the State Extension Director at the college, there is little doubt that many of these directors would be willing to submit such a project to the United States Department of Agriculture for approval. On the strength of funds allotted by the State Forester for this purpose, the Extension Director would be in a position to request an equal amount of Federal Smith-Lever money to meet



OPEN WOODLOT IN GOOD CONDITION

A stand of sugar maple, walnut, coffee tree, ash, red oak and hickory at Prospect, Marion County, Ohio.

it providing, of course, the States' entire quota were not already utilized in other extension projects. As each State's quota of this Federal money will continue to increase yearly until July, 1922, State Foresters have a splendid opportunity to take advantage of this Smith-Lever Act. They should lose no time in getting in touch with the Extension Director of their State in order to work out with him a project which will conform with the provisions of the law, be acceptable to both, and be effective in giving the woodlands under this law the consideration which their importance in the general farm economy fully justifies.

INTRODUCE YOURSELF TO AN AX!

THE ax is intimately associated with the history of the world and has played a prominent part in all stages of its progress," says Mercer P. Moseley, Assistant Federal Fuel Administrator for the State of New York.

"In Biblical lore and historical age its record is one of absorbing interest. Elijah employed it as an instrumentality to strengthen the early Christian faith when he performed the miracle of its rising from the depths of the Jordan. Bryant's 'Forest Hymn' makes illuminating reference in the lines 'Ere man learned to hew the shaft or lay the architrave.' Its function runs the manifold gamut from murder to peaceful pursuit. Under its stroke the heads of both kings and commoner have

rolled in the sawdust in the days when the mob reveled in the sight of blood. It was the general weapon of war in ages past. Gladstone and Lincoln employed it for purposes of healthful exercise. Boone and Crockett reckoned its indispensability with that of the rifle. Today our engineers depend upon it to throw bridges across streams, to erect hurried protection for front-line fighters and to advance the arts of war. And those of us at home can and should use the ax to split dead wood for live fires and thus save coal. This modest and non-spectacular performance is a distinctly patriotic and helpful contribution to the success of our arms across the seas as well as to the comfort of those left behind. Introduce yourself to an ax."

DIGEST OF OPINIONS ON FORESTRY

WILL YOU NOT CO-OPERATE WITH US BY IMPRESSING UPON THE EDITOR OF YOUR NEWSPAPER THE IMPORTANCE OF FORESTRY? WRITE TO YOUR NEWSPAPER

MEMORIAL TREES, the forest fire in Minnesota, the work of the Boy Scouts in locating walnut trees and the saving of paper are subjects discussed by the newspapers of recent issue. In the Memorial Tree and paper saving campaign the American Forestry Association has a big part and with the co-operation of the members of the association will have a still bigger part. Every member should further the suggestion that Memorial Trees be planted for the sailors and soldiers who fought in the war by writing his newspaper and placing the suggestion before committees having memorials in charge. Each member should constitute himself a committee of one to forward to the secretary marked copies of papers mentioning this subject in any way.

Plans for memorials are now being discussed everywhere. The *Boston Post* devoted a page to memorial suggestions leading the article with a letter from the American Forestry Association suggesting that trees be considered in whatever was done. The *Pittsburgh Gazette-Times* in an editorial tells of the association's secretary going to France to offer aid to reforestation that country and of the importance of that work. *The Constitution* of Atlanta takes up the Memorial Tree idea editorially and says the suggestion is "both commendable and feasible." The *Dayton News* points out what fine memorials trees will make and adds that their great value to bird life should be taken into account. "Any plan that will result in more tree planting," says the *Milwaukee Journal*, "should have the most careful consideration." The *New York Sun* says editorially: "No more appropriate, beautiful, or sensible memorial to the men who have fallen in the war could be devised than plantations of trees." The *New York Mail* calls the memorial tree idea one of "excellent possibilities for a great national work."

"Tree planting is at once a simple, thoughtful, artistic and durable means of raising a memorial. It is being urged by the American Forestry Association," says the *Chicago Tribune*, "and because it is so simple of accomplishment and so enduring it should receive immediate and active support everywhere in the United States."

"There would seem to be a quality all but universal in its appeal in the proposal, which to a considerable degree has been put into practice to plant trees along the great highways," says the *Cincinnati Enquirer*, while the *Baltimore Star* takes this view: "The public is becoming sympathetically attuned to the idea of having memorial trees planted for soldiers and sailors." The suggestion for permanent Community Christmas Trees is meeting with hearty indorsement and Earl Godwin, writing in the *Washington Times*, says: "There is a good

idea. Here is a fine opportunity for a 'Victory Grove' that would be one of the finest tributes to our heroes no matter what may be done in bronze or stone." As to the value of memorial tree planting the *Tifton, Georgia, Gazette* says, "that is a splendid suggestion from the *Savannah News*."

"A Spectator" who witnessed the planting of Memorial Trees for four members of the Church of the Holy Innocents, at Tacony, writes in the *Public Ledger*, "the exercises were marked by great reverence and solemnity." "The Listener" in the *Boston Transcript* devotes comment to memorial tree planting and the *Transcript* also calls attention to the request of the Society for the Protection of Native Plants that less laurel be used. The *New York Evening World* prints the story of the laurel wreath sent to President Wilson by the General Federation of Women's Clubs which is urging it as the national flower. The *Post Dispatch* of St. Louis in an editorial asserts there are many available locations for tree planting there and continues, "the groves were God's first temples, and as a living shrine for liberty the twentieth century can offer nothing better." The *Public Ledger* says, "there will be complete unanimity as to the wisdom of formal tree planting in parks and on highways." The country is impatient, the *Public Ledger* adds, with the average memorial that sprang up after the Civil War.

The drain upon the sources of the timber supply of Great Britain are pointed out in a long article in the *Christian Science Monitor* and the *St. Nicholas* treats of what family the peanut really belongs while the *Youth's Companion* tells its readers about the wood needed in making an aeroplane propeller. The *Nashville Banner* carries an article by Latimer J. Wilson on the "aeroplane forest patrol" which subject is attracting attention all over the country. The *New York Herald* had a good story on the offer of the American Forestry Association to help in reforestation France and another on the need of replanting black walnuts.

In an article on "Autumn's Chemistry" the *Portland Oregonian* touches upon the wonders of Nature at the closing of the year. The *Cleveland Plain Dealer* carries a feature story on the quick work in pine tree cutting to make ships at Galveston. The *Washington Star* prints the letter to the Boy Scouts from Secretary of War Baker praising that organization for its work in locating black walnut. The *Washington Times* has printed many articles on memorial trees and the news associations, as could be seen from the page of headlines printed in the December number, have co-operated in a very fine way. The *Times* of Marietta comments upon the fact that walnut trees are disappearing and says, "for every food tree cut

down six should be planted." The newspapers are finding many good stories in the office of the state or city forester since the American Forestry Association started the campaign for memorial trees.

The *Dallas News* is giving more and more space to the value of forestry, having carried a story on "trees and rainfall," by Dr. Joseph L. Cline, the weather observer there, and another on the pecan as a valuable shade tree. "The destruction of timber in the last half century has been little short of criminal," says the *Evening Journal* of Dallas in suggesting more attention be paid in the schools "to the resources which Providence has set aside." The *Detroit Free Press* calls attention to the shortage of several valuable woods in an editorial and reminds us that Ruskin called the tree the link between earth and man. The *Trenton (N. J.) Times* has had two editorials on forestry and several news stories.

The *Charlotte Observer* "will not despair," it says, although "it has hammered on the cross tie conservation idea for years past." The *Observer* goes on to point out the fuel value in the cross ties being burned along railroad rights of way every year. From cross ties to poetry may be a long cry but the newspapers seem ever ready to print anything touching the beauties of Nature and there is always something about trees in that subject. The *Arkansas Gazette* has a poem, "Song of the Pines," and John D. Wells, the sweet singer of the *Buffalo News*, pens of the "First Frost of Fall," from which we take this verse:

The first frost fell last night! It glazed the trees.
The pavements, too, it painted snowy white;
The roofs and walks, as Fancy seemed to please,
It fell upon and coated over night;
The town was white, with autumn's hoary sign,
And here and there in all the world of man
It touched a heart and turned, as it turned mine,
To nutting days in Mills' Grove again.

Once more rally to the call, members of the American Forestry Association. Every tree beckons to you to become a friend—a friend of action instead of an admirer only. Their interests are our interests, heed the call.

Roosevelt

'Tis not alone in Flanders field
The poppies grow;
To him who spent his life for us
Comes Death's fell blow,
Our greatest Soldier of the Right
Is stricken low.

More dauntless spirit never beat
In any breast,
More valiant sword was never drawn
On any quest,
Now wept by all who love the land
He sinks to rest.

We vow that we shall wage his fight
Upon the foe,
We vow that we shall keep his faith
Because we know
'Tis not alone in Flanders field
The poppies grow.

—McLandburgh Wilson, in the *New York Sun*.

TO HELP REFOREST FRANCE

CARRYING a sack of Douglas fir seed, Percival S. Ridsdale, secretary of the American Forestry Association, has arrived in France to offer the help of America in reforesting the 1,500,000 acres of woodland wiped out by the war in the north and east of that country.

The seed carried by Mr. Ridsdale will grow 50,000 trees, valued at about a million dollars, although the sack in which he carried it is small enough to be fitted into a traveling bag. The Douglas fir seed has been asked by the French Government for experimental planting, as it is thought to be suitable for French soil and climatic conditions.

"This vast acreage of forest was used in trench, road and barracks building or else was blasted to pieces by shells," Mr. Ridsdale explained. "Almost a million



Harris and Ewing

A SMALL PACKAGE WITH A BIG VALUE

Taken just before he sailed for France, this picture shows Mr. Ridsdale holding the bag of Douglas Fir Seed which he carried with him. It held 50,000 seeds—all that could be obtained in this country at this time.

French people were dependent upon these forests for their livelihood six months in the year and the French Government faces a great economic problem in providing them with other resources until the forests are restored.

"In collecting the seed wanted by France the members of our association, the forestry departments of the various States, the Boy Scouts and other organizations will be called upon to help," he said. "A million and a quarter acres of forest in the north and east of France have been practically wiped out during the war and must be replaced."

Forestry for Boys and Girls

by E. G. Cheyney

THE PINE WOODS FOLKS

SQUEAKY CHIPMUNK LEARNS SOMETHING ABOUT PINE SEEDS



SQUEAKY Chipmunk was darting nervously around under the blueberry bushes near his hole beneath the old rotten log. He was in a great hurry because he had heard a strange sound and he always made it his business to find out all about every sound that he heard. His scanty little tail stood straight up as he bobbed from stump to stone and from stone to fallen tree.

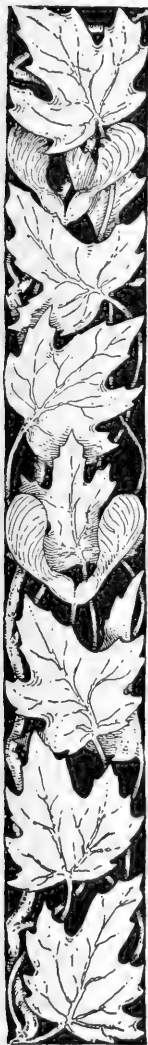
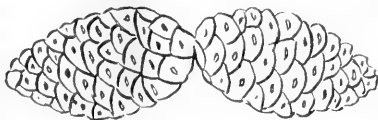
"That's very strange," he said, stopping a moment on his old familiar log to catch his breath, "I heard a distinct bump, and it was not so very far from here either."

With that he scurried off to have a peak behind an old pine knot that he might have overlooked. He had just jumped to the top of the old pine knot when there was a tremendous thump behind him that sent him scurrying into the brush in a panic. But he was back again almost instantly. No matter how badly he is scared his curiosity is so great that he is just obliged to come right back to see what it was that scared him. No sooner had he scampered back to the old pine knot than his bright little eyes discovered the shiny new pine cone lying less than two feet away.

Now Squeaky has a terrible temper and nothing makes him quite so angry as to have been badly scared when there was no real cause for it. His fur bristled up, he pounded the old knot with his tiny hind feet, and squeaked his very maddest. His little tail quivered and jerked with every squeak, and the more he squeaked the angrier he seemed to get. At first he squeaked at the pine cone, but he soon stopped that and turned his attention to the top of the big Norway tree for he knew perfectly well why that cone had fallen.

Sure enough a red form glided out on the end of a limb high up on the great Norway, first over a big bunch of needles, at the end down came an other pine cone. It came so close to him that he ducked in spite of himself, but he immediately recovered with an angry little chatter and squeaked louder than ever. Indeed he squeaked so loud that he was almost afraid of himself.

A scolding chatter came in answer from the top of the pine tree, a chatter so harsh that it was almost a bark. "Don't you touch those cones," Chatter Box, the red squirrel, called down angrily. "Don't you dare touch them. I cut them down and they are mine."



"I know you cut them down," snapped Squeaky, who could be as saucy as anyone when Chatter Box was away up in the top of a tree, "and you be careful where you drop them. You almost hit me that time and if any of them fall in my yard I'll take every one of them."

"You try it," snapped Chatter Box, "and I'll eat some of your children."

This scared Squeaky a little, but it would not have stopped him from taking one of the cones if he had not wanted to see what Chatter Box was going to do with them. He was very young himself and the few pine seed he had stored the winter before had all spoiled on him. He knew that Chatter Box was an authority on pine seed and he wanted to see what he would do with them. He climbed a stub on the old log over his house and watched.

Chatter Box came tearing down the tall Norway in a great hurry, scattering loose pieces of bark in all directions. He grabbed up the cone nearest to Squeaky and carried it to the top of the old stump.

He picked a nice flat spot, curved his tail his back, and, with fixed on Squeaky, he idly around in his cone scales and dig under them. Squeaky "Yes, he was eating

"I thought it was too Squeaky called in

"It is too to eat any of ter Box retor taste pretty he added he picked cone and car onto the

"Have you very many of them this year?" Squeaky asked, ignoring the insult, for he had not yet found out what he wanted to know.

"Stored them," Chatter Box exclaimed in contempt, "I should say not. They will not be ripe enough to store for two weeks yet."

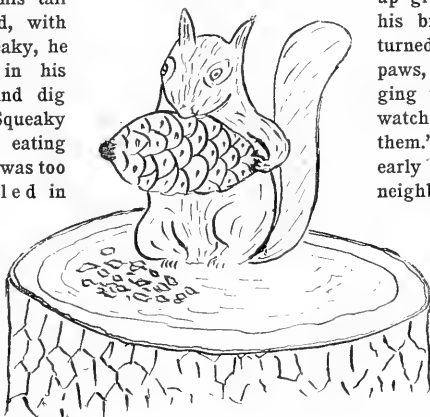
That was what Squeaky wanted to know. That was the reason his had shriveled up the year before. He had stored them too early. So you could eat them for two weeks before you could store them, that was worth knowing, too. The next thing was to get some to eat right now, for it had made him very hungry to see the other fellow eating them right before his eyes. He was in hopes that Chatter Box had cut down more than he could eat and would leave some on the ground. He was afraid to try to climb those tall trees and try to cut them down himself. He counted all the cones he could see on the ground and waited patiently. But Chatter Box slowly picked up one after

He picked a nice flat up gracefully behind his bright little eye turned the cone rappings, biting off the ging the seeds from watched him closely. them."

early to eat those," neighborly fashion.

early for you mine," Chattered, "but they good to me," teasingly as up another ried it up stump.

stored up



another, the pile of green cone scales on the top of the stump grew high, and still he did not show any signs of stopping. At last Chatter Box jumped down to get the next to the last one, and Squeaky could not stand it any longer. When Chatter Box started back for the stump Squeaky made one grand dive for the remaining cone, grabbed it and ran for his life.

Chatter Box saw him and gave chase. It was a close race, but Squeaky won out to his hole, bumped into Mrs. Squeaky who was waiting for him in the doorway, and they both rolled down the passageway together.

Safe inside their snug little home with the cone, they proceeded to shell out the seed while Squeaky told his little wife all he had learned, and they both laughed at Chatter Box who was still scolding out on the old rotten log.

(To be continued)

THE HARMLESS FIRE-BUG

The lightning bug flew through the woods,

And flashed his little lamp;

"This is the thing to use," says he,

"The woods are very damp."

He chuckled to himself and said,

"The woods will soon be drier,

Then this is still the thing to use,

So's not to start a fire.

"So rain or shine or wind or calm,

My little lamp's the best;

No man-made lantern, match or flash

Can ever stand the test."

Problems For Boy Scouts

1. What conifers lose their needles every winter?
2. Does the snow lie deeper in the woods or in the open?

(To be answered in the next issue)

GATHER WALNUTS FOR PLANTING

BLACK walnut is of the most profitable woodland and pasture trees. It is rapidly becoming scarce on account of the important part it has played in the war, and the strong demand for the wood for cabinet material, caskets, musical instruments, furniture, etc.

The nuts for planting should be selected, so far as possible, from vigorous trees producing good-sized nuts in abundance. If squirrels and hogs are not troublesome, the nuts may be planted this fall, putting two nuts in a hole and covering with about four inches of soil well firmed. In many places the safest method is probably to keep the nuts over winter and plant them in the spring. For this purpose a pit, dug eight to twelve inches deep in a well-drained, cool location, is a desirable storage place. A layer of nuts, two nuts deep, is covered with an inch of sand, and so on until all the nuts are stored, after which soil should be mounded over the pit to shed excess moisture. Nuts mixed with sand will keep quite satisfactorily in a cool cellar. A bushel of walnuts contains from 1,100 to 1,400, depending upon the size of the nuts, or enough to plant an acre, using two nuts in each hole, spacing the latter three feet apart each way.

THE TIMBER CENSUS IN THE NORTH-EASTERN STATES

From an address by A. B. Recknagel, at the Annual Meeting of the Society of American Foresters, December 27, 1918.

SHORTLY before the Germans launched their drive on the vernal equinox, which, as far as they were concerned, ended in a winter solstice known as an "armistice," certain members of the War Committee of the Society of American Foresters foregathered in the New York office of R. S. Kellogg and planned another drive which, it is hoped, will result far more favorably.

The objective was nothing less than a timber census of the Northeastern States. Statistics on the *consumption* of forest products we have—excellent statistics—but we need to know with equal accuracy as to the existing *supplies* of timber so that we may balance supply and demand through the adoption of a proper forest policy. The meeting was held on April 25, 1918. Those present represented the States of Maine and New York and a plan of campaign was developed for securing the desired data. The chairman of the War Committee, Prof. Toumey of Yale, was unable to attend, but shouldered the burdens of securing the needed data for the States of Massachusetts, Rhode Island, Connecticut, New Hampshire and Vermont by enlisting the co-operation of various organizations in these States.

The campaign developed rapidly and met with an unexpected degree of support on the part of timberland owners. Forms for reporting estimates were prepared and sent out in each State by some recognized agency. In New York Mr. C. R. Pettis, Superintendent of State Forests sent out, under date of May 15, a strong letter, stressing the urgent need for reliable information about merchantable standing timber.

What followed up to the ending of the war, has been told by Prof. Toumey in the November issue of the *Journal of Forestry*, issued by the Society of American Foresters.

On the day following the signing of the armistice the "Census Makers" gathered in Boston and, with the joyous shouts of the peace revel in their ears, decided that despite the end of the war the valuable data accumulated in the census should not be lost but that the work should be carried to completion. It was left to each State to compile the data and to publish them through whatever agency in the State seemed most appropriate. Then the Forest Service will probably publish a summary for the entire Northeastern region. The Reconstruction Conference of the National Lumber Manufacturers' Association in Chicago on November 23, 1918, passed a strong resolution endorsing the plan.

So the matter stands at present. Conceived as a piece of war work the timber census gives promise of filling a peace need as well.

FALL or winter pruning of grape vines may be done at any time during mild weather from November to March, while the vines are in a dormant condition.

THE SANDPIPERS

(FAMILY SCOLOPACIDAE)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

WHEN the waters in our lakes and ponds recede during late summer and leave exposed great areas of soft mud, they would become very unattractive were it not for the flocks of graceful little birds that assemble upon them. With jerking heads or tilting tails they trot along the soft oozy shore in search of the larvae that lie concealed in the mud. These are the sandpipers. There are tiny ones, smaller than spar-

phalaropes, lobed toes, but they are all very similar in general appearance.

There are about 100 species of sandpipers, most of them being confined, except on their migrations, to the northern parts of the Northern Hemisphere, many of them nesting within the Arctic Circle. Forty-five are found in North America, some of them confined to the West, some to the East, but the majority nest in the far north and follow in their migrations the routes of abundant food. Thus they are more common along the sea coast than inland.

They are great travellers, these sandpipers, perhaps the greatest of all, some of them traversing the entire length of both continents in their migrations. The majority of species spend the summer on the barren grounds of the far north and, in the fall, though some of them stop on our Gulf Coast, many speed their way across the Caribbean to northern South America and some continue down the coast even to Chile and Patagonia. When they leave their summer homes they have stored up great layers of fat, but when they reach their winter quarters, the majority have grown thin. Particularly is this true of those that follow the route of the golden plover on the long flight from Nova Scotia to Venezuela or from Alaska to the Hawaii



"SANDPEEPS" IN FLIGHT

Least and Semipalmated Sandpipers showing the characteristic pointed wings of the family.

rows, and there are larger ones as big as pigeons, sometimes in separate flocks, sometimes all mingled together. They are brownish or gray above and white below, with slender legs and long slender bills, and except for their size, all look much alike. It takes a sharp eye to distinguish the different species when they have assumed their fall plumages. But it is in this plumage that we see the most of them for on their way north in the spring, the waters are high, mud flats are scarce, and they are in a hurry to get to their nesting grounds. In their breeding plumage many of the species are strikingly marked with black or chestnut and are easily distinguished from one another, but in the fall they constitute a post-graduate course in bird study that appeals to those who have passed through the warblers and the sparrows and the flycatchers and are ready for more difficult problems.

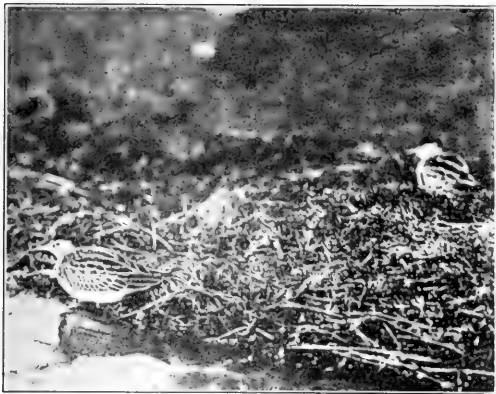
Together with the plovers, the avocets and stilts, the turnstones, and the phalaropes, the sandpipers make up the great group of shore-birds. The plovers have much shorter bills than the sandpipers, the avocets and stilts, much longer legs, the turnstones squarish bills, and the



THEY MAKE THE SHORES ATTRACTIVE

Stilt Sandpipers are feeding in a close flock at the right; a dowitcher, yellow legs and Semipalmated Sandpipers are at the left, black terns are in the background.

Islands without a single stop. Twenty-five hundred miles in a single flight seems almost incredible, but such is the accepted belief today with regard to the plover and other shorebirds that accompany it. Indeed they have been seen passing over the Lesser Antilles as though untired and continuing on to the main land of



HIDING IN THE OPEN

Pectoral Sandpipers crouch on the shore to escape detection.

South America though good stopping places were plentiful. When instinct compels birds to make such a trip, it is little wonder that it carries some of them on southward far beyond the bounds of reason and good sense, even to Cape Horn, a distance of perhaps 9,000 miles from their nesting grounds.

In former years all of these shorebirds were considered game birds and were shot in such numbers that some of the species were nearly exterminated. This was possible because they ordinarily fly in close flocks so that many can be killed at a single discharge of the gun. Now, through the Migratory Bird Treaty with Great Britain, they have passed under Federal jurisdiction and all save a few species are given protection. Of all the shore-birds, only the yellow legs, the Wilson's snipe, the woodcock, and the black-bellied and golden plovers remain on the game list for which there is an open season.

The commonest species of sandpiper is the spotted sandpiper, "tip-up" or "teeter-tail" as it is variously called. In summer it is found along almost every stream and lake from Northwestern Alaska to Louisiana, and in winter, from Louisiana to Southern Brazil. It can be distinguished from the other sandpipers of its size, about that of a sparrow, by the conspicuous spots on its underparts. In the fall, however, these are lost and it would be hard to identify were it not for its constant teetering. Several other species, and especially the solitary sandpiper, jerk their heads when they walk, but the spotted teeters its tail or its whole body as

though it had difficulty in balancing on its slender legs. It flies with a peculiar hovering movement of its wings which show a narrow gray line down the middle.

The solitary sandpiper is perhaps the next most common species inland. Although it probably does not nest in the United States, it is very late in moving northward in the spring and early in returning in the fall so that except for the month of June, it is nearly as common in most places as the spotted. It is somewhat larger and darker than the spotted sandpiper and lacks the spots on its underparts and shows conspicuous white outer tail feathers when it flies. It is the one sandpiper that seems to prefer woodland pools and it ventures among the trees quite readily.

The yellowlegs are similar in color pattern to the solitary sandpiper, but are grayer and have whiter tails. There are two species, the greater and the lesser which are almost identical except for size. Indeed when there

are no other birds about so that the size can be correctly judged, it is sometimes impossible to tell which species is under observation. When they take flight, their notes will often announce them for the smaller species never gives but two notes together, "wheu - wheu," while the greater gives three or more in succession, "wheu, wheu-wheu-wheu-wheu, wheu, wheu-wheu." The yellowlegs have withstood the onslaught of the gunners better than any of the other species and are still



OCTOBER MORN

A lesser Yellow Legs feeding in the early morning.



THE WHITEST OF THE SANDPIPERS—THE SANDERLING

It is likewise the only Sandpiper with but three toes. It prefers the drier sandier shores.

fairly abundant in suitable places during May and again from August to November. Indeed they have been much more successful than the knot, the willet, and the Bartramian sandpipers.

The knot which is about the size of the yellowlegs, but with a shorter bill and legs, formerly occurred in

close them. They have a striking call during the breeding season like the syllables "chr-r-r-r-ee-e-e-e-o-o-o-o-o-o-o-o," given with a rising and falling inflection. Indeed most of the shore-birds have striking whistles and as they are quite easily imitated and decoy to the imitation, it has made their extermination all the more possible.



A "SANDPEEP" ON THE SHORE

The Least and Semipalmated are the smallest of the Sandpipers. This is the Least.

flocks of thousands along the coast, but has been so decimated that it can no longer be considered a game bird. It has the unfortunate habit of flying in very dense flocks so that many could be killed at a single shot. In the spring the underparts of the knot are a beautiful rufous, giving it the name of robin snipe.

The willet is considerably larger and has striking black and white markings in its wings. It was formerly found along the coast as far north as Nova Scotia, but is now rare north of Virginia.

The Bartramian sandpiper or upland plover as it is better known, is about the size of the yellowlegs, but is brown instead of gray and has a shorter bill. It is more a bird of the interior than the other sandpipers and was formerly very abundant throughout the grassy plains and pastures of the Mississippi Valley. It is ordinarily a shy bird, but will permit one driving or on horseback to approach very close. Market hunters took advantage of this in former years and nearly exterminated the species. In a few places, however, they are still firmly established and now that they are protected by the Federal Law should increase. Like the willet they always stretch their wings straight up over their backs when they alight and then

broad band of black across the belly, but in the fall it becomes entirely gray above and white below. It can be distinguished from the others of its size by its slightly decurved bill. The remaining sandpipers are too numerous for full description, but the white-rumped is very similar to the red-backed in the fall, the Baird's that

The smallest of the sandpipers, called "sandpeeps," are the least and semipalmated which in outward appearance are very much alike, the semipalmated being somewhat grayer. They are usually seen in flocks which along the coast are often of considerable size. A much whiter species, somewhat larger, is called the sanderling. It prefers the drier, sandier shores, whence the name.

The pectoral sandpiper has almost the exact color pattern of the least sandpiper, but is much larger. The red-backed sandpiper is conspicuously marked in the spring with reddish-brown upper parts and a



ANOTHER "SANDPEEP"

But this time a Semipalmated Sandpiper—it has a somewhat heavier bill and is somewhat grayer than the Least.

resembles a small gray pectoral, and the stilt sandpiper with dark legs that resembles the yellowlegs might be mentioned. Then there are other sandpipers that have departed from the type of those thus far mentioned. The curlews, for example, are considerably larger and

browner and have strongly decurved bills. Like the willet and upland plover, the curlews were formerly abundant, but are now scarce. Indeed, one species, the eskimo curlew, is believed to be extinct. The godwits have slightly upcurved bills and the dowitcher, Wilson's snipe and woodcock have exceedingly long probe-like bills. What has been said regarding the curlews applies also to the godwits, for while the marbled godwit is



NO SPOTS ON THIS

Fall styles with the spotted Sandpipers permit of no polkadots. A September Spotted Sandpiper.

still fairly plentiful in the Northwest, the Hudsonian godwit is one of the rarest shore-birds.

The dowitcher is more like the other sandpipers and often associates with them on the open mud flats, but the Wilson's snipe prefers the grassy marshes and seldom ventures out on the bare flats except early in the morning and at dusk. The Wilson's snipe is a better game bird than the other small sandpipers because of its habits. It sometimes travels in flocks, but they scatter when feeding and do not get up together nor afford a "pot shot." They ordinarily escape detection until they jump with a somewhat startling "kick" or "bleat" and quickly get off on a zigzag course that puzzles the hunter.

Even more aberrant and the best game bird of them all, is the woodcock. It never ventures out into the open except after dark, but spends the day usually in alder thickets, though sometimes at a considerable distance from water. Because of the nature of its haunts, it is a difficult target for the hunter. It has, however, the unfortunate habit of never flying very far and allowing itself to be flushed and shot at time and again. Once in its winter quarters in the South, a bird remains in the same thickets until time to move northward again. Because of this, in many places hunters with dogs have been able to exterminate nearly all the birds wintering in some localities. This has resulted in woodcock becoming extremely scarce in most places.

The woodcock is one of the most protectively colored

birds that we have and on the nest it frequently relies entirely upon its coloration and will allow itself to be touched while incubating. It is said of the European woodcock that when it is frequently disturbed with its young on its feeding grounds it will remove them to some upland thicket for the day and bring them back to the feeding ground at night, carrying them between its thighs. Both the snipe and the woodcock have flexible bills and the tip of the upper mandible can be moved separately from the rest of the bill. This permits them to seize the worms or grubs which they find by probing in the soft soil. The tips of their bills are filled with sensory pits covered with a soft membrane which enables them to locate their food.

With the exception of one species, all of our sandpipers nest on the ground. The exception is the solitary sandpiper, which, so far as is known, utilizes the old nests of other birds like the robin and grackle, sometimes at a considerable distance above ground and away from the water. All sandpipers lay three or four eggs, very large for the size of the bird, which are sharply tapered so that they will fit together like the pieces of a pie. Other-



A SIMPLE LITTLE HOME ON THE SHORE

Sandpipers do not build elaborate nests but merely line a depression with a few straws. They lay large pointed eggs that fit together like the pieces of a pie. This is the nest of a Spotted Sandpiper.

wise the old bird would be unable to cover them. They are usually buff or tan in ground color, or with some species greenish, heavily spotted with black or brown.

Young sandpipers, when hatched, are covered with down, often of a striped pattern, and are able to run about and follow their parents or even swim across streams. The first plumage is similar to that of the adults in the fall and in the spring all molt into the

breeding plumage. If there is a bright plumage, females don it as well as the males. Indeed, among the phalaropes which are closely allied to the sandpipers, the females are brighter than the males. It is interesting

and fly larvae and a few of them frequent the uplands and catch grasshoppers and other destructive insects. On the whole, however, they commend themselves to us more because of their graceful appearance and charming



HOME AGAIN

The Spotted Sandpiper returns to its nest and inspects it closely to see that all is well before taking its place upon the eggs.



THERE'S NO PLACE LIKE HOME

For keeping a Sandpiper busy. She has only four eggs, but they are so large that she covers them with difficulty.

to note that with them the males are left to incubate the eggs and care for the young while the females assume no responsibilities after laying the eggs.

The food of the sandpipers includes many mosquito

ways. Our shores and mud flats would be desolate indeed with no birds to enliven them and most people are glad to see all of the smaller species removed from the game list.

THE meeting of the newly organized Tennessee Forestry Association, which was to have been held in December, has been postponed to some time in January. It is proposed that the By-laws and Constitution shall be broad enough to include the interests of the lumbermen, timber owners and farmers, as well as all those interested generally in the knowledge of tree growth. Conditions in Tennessee promise bright prospects for a splendid working forestry organization in the state.

ONE of the principal markets for American lumber will be found in Italy, according to a special cable to the Italian-American News Bureau. Reconstruction work in the recently invaded territory to the northeast of Venice is already making large demands for building material, and plans for building projects contemplate the expenditure of millions of lire by the Italian government.

AS this magazine goes to press, comes the first acknowledgment from overseas of the Christmas boxes sent the boys by the Welfare Committee for Lumbermen and Foresters in War Service—From R. Aaronson, of the Eighth Company, Twentieth Engineers. "Accept my kindest wishes for the New Year. Thanks very much for the package. It sure makes the fellows feel good to know that the folks back home are thinking of us."

THE building of wooden ships is likely to continue for years to come, according to reports from the various ship yards throughout the country which are constructing ships for the Emergency Fleet Corporation, and have completed only 50 per cent of their contracts.

PLANT WALNUT TREES

PRUNING FOR PROFIT

ARE YOU RAISING FRUIT OR WOOD?

BY WILL C. BARNES

THE overland train slipped into an obscure siding on the edge of a little town in the fruit belt of eastern Kansas. On the platform of the observation car, several travelers watched a man at work in a nearby orchard pruning apple trees; "dehorning 'em" a western cattle man called it.

Naturally the conversation drifted into the subject of pruning. One of the party, a Boston merchant, remarked that, until recently he had the idea that pruning was a "carpenters job" pure and simple. "I know better now," he explained, "thanks to some rather practical lessons received while on this last trip to the Pacific coast." Some one pressed him for particulars. He lighted a fresh cigar and settled back in his chair.

"For fifteen years," he began, "I have been the proud possessor of a twenty acre orange grove in southern California. During all these years I have seen it only twice, but have been giving it 'absent treatment' through various alleged 'orange grove experts,' the last being a man whose main qualifications for the job of caring for it, were his absolute integrity, and ability to distinguish between his own and his employers money, and an economical nature that Harry Lauder himself would envy. During the first six or seven years of ownership, I went through the whole gamut of experience in 'hiring and firing' a genial lot of pirates and spendthrifts, whose one ambition seem to be to draw their pay and give in return the least possible amount of labor. Thus when I 'met up' with this paragon of economy and honesty I

waived all other requirements and turned the place over to him with a thankful heart.

"I soon found that his economical ideas permeated his whole system, for his letters and reports were few and short and if brevity is the soul of wit he is at once the wittiest man ever.

"After several years of his management I decided to visit the place and see for myself what was happening. Across the road from my place was a grove whose owner was reputed to be making big money out of his trees. To him I went for advice.

"Your trees look so ragged and uneven in their outlines' I ventured, pointing to my own which, according to my innocent eyes were better looking being as shapely and even as a lot of Christmas trees.

"Yours do look better from an artistic standpoint, but let me show you why that isn't the ideal shape for an orange tree.' We walked over to one of his trees. It was almost ragged in appearance and instead of the dense wall of green which



EUREKA LEMON TREE—BEFORE PROFESSIONAL PRUNING

One of the lemon trees told of in this story—so shapely and attractive to the eye!

formed a fairly impenetrable mass on the outside of my trees, his were open to the heart, and one could see deep into them at any point. There wasn't a dead limb on one of them, while they bore plenty of young vigorous limbs all new growth. The sunlight reached every part, inside and out, and each tree was loaded with fruit.

"Then we walked over to my side of the road. The tall shapely trees looked wonderfully attractive to me. We got down on our knees and crawled under the low sweeping boughs into the tent like center. Instead of

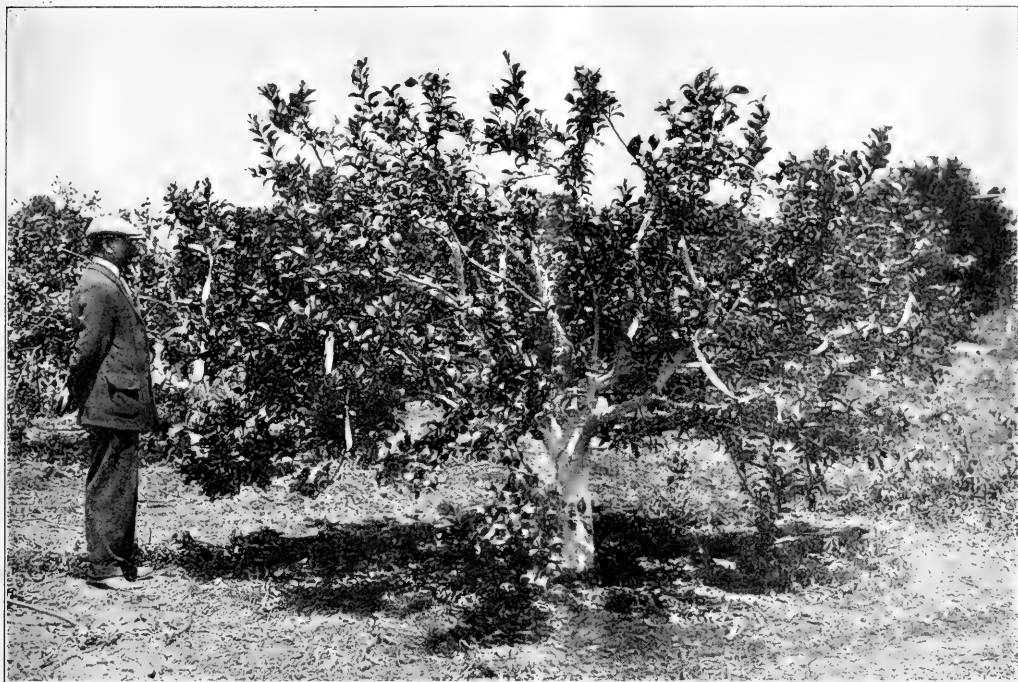
young green growth there was nothing but dead limbs in the center and the shade was so dense that the sunlight scarcely penetrated into the heart of the tree.

"'A victim of poor pruning' was his remark. Then he showed me how the pruning must have been done by inexperienced men for instead of cutting the limbs off as close as possible to the body of the tree, most of the stumps had been left an inch or two long. This prevented the bark of the tree from healing over the wound left by the operation, nature's remedy, and each stump was rotting at the end, an ideal place for disease to get a foothold.

"Then and there I learned that to produce citrus fruits you must open up your trees to the sun and air, and by

know it all, want \$3.50 a day. Whats more, the Japs go right ahead with their work and get done, while the Dagos fool along on the job, look at the trees, stand off and gaze at 'em as if they were trying to paint a picture and them trees were models.'

"I said nothing, for it seemed hopeless to try to educate the man who as the bible says has neither the hearing ear, nor the seeing eye. Years of work in an orange grove had apparently not taught him that there was a scientific side to pruning and it did not merely consist of sawing off a few limbs here and there, with the main idea of securing a tree shaped like a toy Christmas tree, regardless of the fact that the tree's great purpose in life was presumed to be fruit production.



THE SAME TREE, BUT AFTER THE VISIT OF THE PROFESSIONAL PRUNERS

A total wreck—ragged and unsightly to the eye. It is the same Eureka lemon tree in my grove, after manhandling by those Corsicans.

keeping the dead wood cut out, furnish plenty of young vigorous limbs upon which to grow it. To an up-to-date orange grower, dead wood on an orange tree is anathema.

"I went after my man on the question of pruning. 'Who does our pruning?' I demanded. 'Japs, mostly,' was his reply. 'Are they the best for the work?' I was inexorable. 'Well—perhaps they aint as scientific as some others but,' and here his penchant for economy came to the front, 'they do the work just as well, as far as I can see, and charge a whole lot less.' 'For instance,' I persisted. 'Well, the Japs charge \$2.25 a day for pruning, while the Sicilians and Italians who claim to

"The next day in answer to my request my friend sent a Corsican pruner to see me, a man born and raised in the citrus groves of his native land. He had great hoops of rings in his ears, was dark and swarthy in complexion and reminded me of the three bandits in Fra Diavolo. Also he weighed about 200 pounds, was not an inch over five feet four in height and his build recalled a boyhood recollection of a picture in a Sunday school book of the mighty Sampson engaged in his cheerful task of tearing from their roots the gates of Gaza.

"Also he arrived in a Ford, which impressed me. The Japs came on foot. He looked over my splendid lemon

trees and shook his head. Crawled on his hands and knees under their low sweeping boughs to get inside; peered up through their dim interior and shook his head still more. Every time he did so those great gold ear-rings waved and blinked in the sunlight like a section of the jewel tower at the Frisco fair.

"With him was a young chap to whom he occasionally confided a few thoughts in their own language. I began to feel uncomfortable, as if I had perpetrated some outrage against them both, and that the outrage had something to do with the way those trees had been pruned. Nor was my judgment wrong. In his experienced eyes a gross outrage had been committed upon every tree in the whole grove. He was arrayed in a sky blue suit of clothes, a stiff linen collar at least three and one-half inches high encircled his short brown neck and a brilliant red four-in-hand tie lit up his front like an Arizona sunset. It was a very hot day, the trees were dusty from the long rainless spell, and when he finally emerged from his last inspection he looked somewhat the worse for wear. His collar was wilted to a rag, that sky blue creation with trousers that measured more across the seat than they did in length—peg tops of the most exaggerated type—a favorite cut of his class, was dusty and laced with cobwebs. He mopped his rosy face with a pink handkerchief that after the operation reminded you of the print shop roller towel. Breathlessly I waited for his verdict.

"'You trees bad shape,' he blurted out, just like that, as if to give me the worst right at the beginning. 'Looka like some wood choppa man done da prune.' He waved his arms towards the lemons. 'He nicea looka trees for park, mabbeso, but no gooda for fruits. 'Dat tree,' and he picked out one of the most shapely in the lot 'dat

tree take one gooda man four hour to prune right, maybe so do four tree one day—dat a gooda work.'

"I did some mental figuring. Four trees divided into \$3.50 meant almost 90 cents a tree, there are 80 trees to the acre—\$72 an acre for pruning. I hoped my man had not heard the time limit set by the gentleman with the ear-rings. I sighed. Experience surely did cost money. Nevertheless my blood was up and I made a bargain for three men to come the next morning and start the work. I didn't get down to the grove until about three o'clock the next day. The rows of lemons were the first trees in the grove to strike the eye as you alighted from the trolley. I glanced towards the place. The sky line seemed to have a strange, unnatural appearance. The first rows of trees looked as if a cyclone had struck them. They stood rough and gaunt, their denuded limbs holding their mangled stumps toward Heaven, as if in mute appeal against such an outrage as seemed to have been perpetrated upon them. On the ground there was apparently more wood than in the trees. In fact, about some of them the limbs made a pile quite as high as the trees themselves.

"Now pruning to me had always meant a gentle lady-like clipping of tips here and there, a sort of polite tree manicuring if you please. This work had apparently been done with a ruthless hand almost heroic in its treatment. But I had determined to go the limit on the reconstruction of my grove and if this was the proper way to do the job I would make no outcry.

"Time however, justified the treatment. My Corsican friend and his fellow conspirators knew their business. Next year those trees will bear fruit on every limb where none has been borne before, for the trees have produced new wood so fast you can almost see it grow; fruit bearing wood of the best kind."

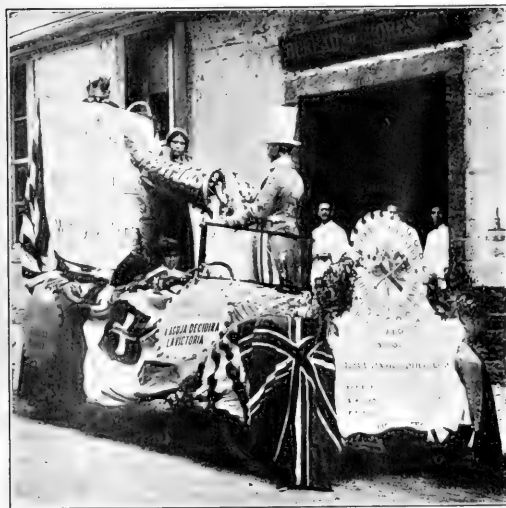
NEXT SEASON AT GLACIER

SECRETARY of the Interior Lane announces that the enterprises engaged in the accommodation and entertainment of tourists at Glacier Park have already completed arrangements for the 1919 season, which begins June 15 and ends September 15. All hotels and chalets will be open and there will be adequate transportation facilities on the road and trail systems. The usual rates for service will prevail.

The National Park Service plans to make many new trips available for Glacier Park visitors next summer. In this connection, a new trail across the Continental Divide through Logan Pass, connecting the St. Mary Lake region with Granite Park and Lake McDonald, is worthy of special mention, as it promises to be an exceptionally popular feature in a successful after-the-war season.

A FOREST FIRE IS A REAL ENEMY

Carelessness causes many fires. Are you careless? Never leave your camp fire without making sure it is completely out. We won the war to defend Democracy. Must we now fight forest fires? Are you careful with fire in the forest? Burning matches cause fires. Break your match in two before throwing it away. If you discover a forest fire, put it out.



PHILIPPINE FORESTERS ARE PATRIOTIC

THIS IS THE FLOAT OF THE BUREAU OF FORESTRY IN THE FOURTH LIBERTY LOAN PARADE ON OCTOBER 12, 1918, AT FAR-AWAY MANILA.

PLANTS THAT OCCUR IN BOTH NORTH AND SOUTH ATLANTIC STATES; TOGETHER WITH NOTES ON THE AMERICAN SPARROW HAWK

BY MAJOR R. W. SHUFELDT, M. C., U. S. A.,
MEMBER CHICAGO ACADEMY OF SCIENCES, ETC.

(Photographs by the Author)

IT IS a well known fact, especially in the northern sections of the country, that some of the plants blooming during the early summer months have very inconspicuous flowers, but when autumn comes around and

these same plants go to seed, their seed-pods stand among the most ornamental growths of the kind met with in nature. One of the most conspicuous of these is seen in the Climbing Bittersweet (Fig. 2), whose flowers are notably small, greenish, and in little clusters at the termination of the branches. Hardly anyone would notice them, unless specially searching for a specimen. However, late in the fall an entire transformation takes place in this "twining shrub," as some botanists have called it. Its beautifully shaped leaves turn to a brilliant Naples yellow and its

seed-pods to a deep orange. Nor is this all; for the latter, upon splitting open into three partitions, display the gorgeous scarlet-tinted covering to the seeds. The dis-

play they then make is one of marked beauty, and branches—or runners—bearing the pods are gathered by many for home decoration. It is truly wonderful the length of time these seed-pods will retain their original

colors without fading in the least degree—sometimes for many years. A fine branch, at hand at this writing, was gathered some ten years ago in New York State, yet the yellow and orange tints are as intense as the day it was gathered.

Beyond the fact that this vine is related botanically to the Spindle Tree (*Eoomy-mus*), it is difficult to understand why some insist upon calling it a *tree*—the "Staff Tree." Doctor Gray called it a "twining shrub." Matthews speaks of it as a "twining, shrubby vine, common on old stone walls and roadside thickets, and sometimes

climbing trees to a height of twenty or more feet. The light green leaves are smooth and ovate, or ovate-oblong, finely toothed, and acute at the tip; they grow alternately



A GRANDFATHER CHESTNUT ALL READY FOR THE FIRST SNOW BLANKET

Fig. 1—Along the hill-top, just over the western boundary of Rock Creek Park, Washington, District of Columbia.

and somewhat in ranks owing to the twisting of the stem. The tiny flowers are greenish white, and grouped in a loose, spike-like terminal cluster; the five minute petals are finely toothed along the edge, and the five stamens are inserted on a cup-shaped disc in the manner explained."

Bitter-sweet vine is often seen growing over the old stone walls in New England, the deep gray of the latter affording a fitting background for the matured fruit in the autumn. It would appear that it is not found in nature further south than North Carolina, while it ranges westward to New Mexico and north to the Dakotas.

It is a wide span between *Celastrus* and any of the Iris family, a species of which is next to be considered—though only in part; that is, attention is invited to its remarkable fruit, which, in any instance, so closely resembles a big



THE IRIS FAMILY IS KNOWN AS THE *Iridaceae*, AND ITS BEST KNOWN GENUS IS *Iris*, WHICH HAS BEEN CREATED TO CONTAIN THE IRISES, THE FLAGS, AND THE FLEUR-DE-LIS.

Fig. 3—One of the daintiest plants of this group is the Blackberry Lily (*Belamcanda chinensis*), shown here just before the seed pods open up.

ripe blackberry. (Figs. 3 and 4.) Next summer its flowers will form the subject of one of our illustrations, as specimens of them were not obtained during 1918. We may say here, however, that its flat, blade-like leaves closely resemble those of the common iris or Fleur-de-Lis, the favorite flower of France; some of these leaves may be seen, in part, in the cuts. In passing, it may be said that the flowers of the lily are of a deep orange, finely and irregularly speckled with deep crimson and purple. On an unnumbered plate, Neltje Blanchan gives us a pretty illustration of them, though it has suffered through undue reduction in reproduction. This authority informs us that the plant originally came from China, and was first reported as a wild flower at East Rock, Connecticut; next on Long Island, and then at Suffern, New York. It is surely a very beautiful addition to our native flora, and it is hoped that the Orient will favor us in a similar way with still other plants.

The genus of the Iris family containing the greatest number of species is *Sisyrinchium*, the Blue-eyed grasses, of which Gray gives some fourteen different kinds for eastern United States alone, against the single species of the

Blackberry lily described above. The flowers of these two genera are somewhat alike in form, and quite different from an iris or Fleur-de-Lis.

Our remarkable parasitic plant, the common Dodder (*Cuscuta groenovii*), was figured and described in a recent issue of AMERICAN FORESTRY; but who would for a moment think that this curious murderer of other plants was a member of the

same family as the beautiful morning glories (*Ipomoea*), or the bindweeds, and the sweet potato vine? Yet all these plants and still others have not a few characters in common, which, from the viewpoint of the scientific botanist, certainly throw them into one and the same assemblage—the *Convolvulus* family; they owe this name to the fact that in all of them the corolla is *convolute* or twisted in the bud. Two such buds are here shown in Figure 5, which illustrates our common Bindweed. All morning glory buds are twisted up like this, as are the little scarlet ones of our Cypress Vine; and there are a great many plants of



OUR *Celastraceae* OR STAFF TREE FAMILY HAS SOME CURIOUS PLANTS GROUPED IN IT. THIS IS THE SHRUBBY BITTERSWEET, A STOUT VINE, NAMED THE "STAFF TREE" (*Celastrus scandens*)

Fig. 2—It has also been called the Climbing Bittersweet, or the Waxwork vine. Its leaves are beautiful and so are its remarkable berries.



SOME OF THESE CERTAINLY LOOK LIKE RIPE BLACKBERRIES, AND SO WILL ALL OF THEM WHEN THEY FULLY OPEN

Fig. 4—The plant originally came from Asia, and its generic name is of East Indian origin. It is known as the Blackberry Lily (*Belamcanda chinensis*).

this group in other countries besides the United States.

In the case of the Bindweed, the flowers are of a glistening white, and for this reason the plant may be recognized at a long distance. It often climbs and masses upon other plants, cutting off the sunlight from the latter. Then, again, we may find it in the most shady corner of some deep wood, and the example here shown flourished in such a place, being photographed *in situ* with no little difficulty. Finally, we may find bindweed growing in great masses in an open field, with hundreds of its lovely, immaculate flowers glistening in the bright sunlight. Sometimes these blossoms are tinged with pink, and other species possess still other characters. The one here shown is the common Hedge Bindweed (*C. sepium*); it may become ten or twelve feet long, while other species, such as Trailing Bindweed (*C. s. repens*), the Small Bindweed (*C. arvensis*), and others, rarely exceed a yard or less in length. Most of the larger species of bees are great patronizers of the representatives of this family of plants. It is by no means an unusual sight to see a Dodder vine twisting itself all over a Hedge Bindweed, exhausting its life juices—and to think that both are members of the same family! It might well be called a kind of floral fratricide.

Our Cypress Vine (*Ipomoea quamoclit*), another convolvuline species, already referred to above, with its pretty little scarlet flowers, came from Tropical America, and now flourishes in many places in the South. We frequently see it growing over garden fences and similar places. Its flowers are said to be white in the case of some plants, and there are other species and subspecies (varieties) of it.

We have many interesting plants in the Lobelia family, several of which have already been figured and described in previous issues of AMERICAN FORESTRY. An average example of the Great Lobelia is here reproduced in Figure 7; and this is a plant which, in favored spots, may occur in great numbers, producing, when in full flower, a blaze of splendid sky-blue, which may be seen a long distance off. Sometimes its flowers are pure white; and, whatever their color may be, they

are usually found growing in moist or wet places.

When our Ruby-throated Humming-bird of the East was more plentiful than it now is, it was frequently seen visiting these flowers of the Great Lobelia, as their tube-shaped corollas constituted the very style of flowers that these little gems of the bird-world fully appreciated. The cross-fertilization of the Lobelia is, however, principally accomplished through the agency of bees of various species and certain large flies.

THE AMERICAN SPARROW HAWK

BY MAJOR R. W. SHUFELDT

(Photograph by the Author)

WE have a splendid array of falcons and hawks and their near allies in the bird fauna of this country, and of all these many species our Sparrow Hawk is not only the smallest but decidedly the handsomest in plumage. Upwards of a dozen vernacular names have been bestowed upon it in different parts of the United States, while its scientific name, given it by Linnaeus generations ago, *Falco sparverius*, is the one by which every ornithologist knows it the world over.

In length, the Sparrow Hawk measures less than a foot, and the plumage color-pattern is different in the two sexes. Both are very handsome, though the male is rather the more striking in this respect. An adult male, in full breeding-feather, has the top of the head of a clear ashy blue, all to a central patch, which latter is a bright chestnut. The back of the neck and the sides are of a dingy pale yellow, with an ashy area on the former. The entire back and shoulder is of a clear chestnut rufous, transversely barred with black. Wing-coverts and secondary wing-feathers ashy blue like the crown,



THIS LOVELY WHITE FLOWER IS OF THE VINE KNOWN AS HEDGE BINDWEED, WHICH, IN THE SOUTH, MAY BLOOM UNTIL VERY LATE IN THE SEASON

Fig. 5.—Bindweeds are close relatives of the Morning Glories and Cypress Vines; they are all grouped in the *Convolvulaceae* or the Convolvulus family.

the feathers each dotted with black; the flight-feathers are dusky, margined with yellowish white. The rufous-colored tail is tipped with white, and embellished with a subterminal bar of black. There are markings of black on the side of the head and nape. Breast, and to a degree below it, pale rufous or rusty, and then whitish to the tail. All of this area is spotted with black, beginning above, with fine dots on each feather, and ending below with much larger ones. Tail-coverts beneath, pure

white. Irides, rich brown; feet, yellow with black claws, and a yellow area around either eye as well as the base of the blue-tinted beak.

In the female, fine black bands mark the entire tail, the terminal one being broad. She has a longitudinally streaked crown, with pale brownish streakings on a yellowish-white breast and lower parts. Her shoulders are rufous red, while in most other respects she more or less nearly resembles the male in her coloration.

Our Sparrow Hawk chooses curious places sometimes wherein to lay its clutch of beautifully marked eggs, the ground-color of which usually is a cream-white. Occasionally the female is satisfied with a deserted hole of any of our larger woodpeckers, while any other hollow in a tree has been made to answer. The eggs have also been found in rock cavities, and in various holes in clay and sand-banks, while nesting-boxes set up for other birds have been selected; and when these were not available around the home, the pair will even choose any old cranny under the barn-roof or a similar place in any of the larger out-houses.

Judging from the above, it is not at all difficult for us to imagine that our little Sparrow Hawk has a strong leaning toward real sociability with respect to his arch enemy—man. Many years ago, I had in my possession a tame one, which was kept for several months, and during all that time it was one of the most interesting little pets imaginable. There was no difficulty whatever in my making a number of fine photographic negatives of him, and the picture obtained from one of these has been reproduced as an illustration to the present article. Perhaps I may be pardoned for the pride I felt when, with others of a set of animal pictures, it won a prize at an exhibit given under the auspices of the Aintree Photographic Society at Liverpool in November, 1898 (Class "K")—twenty years ago.

Only at exceptional times do Sparrow Hawks prey upon our small song birds, and upon still rarer occasions

very young chickens or ducklings are taken by them from the farm yard. On the other hand, however, this little raptorial prince kills and devours every year simply thousands of field mice, moles, grasshoppers, crickets, and no end of other insects and small mammals, the ravages of which are only too well known to every farmer and agriculturist from one end of the country to the other.

In the autumn, when we observe a Sparrow Hawk hovering in his characteristic way over some corn-field where the grain has been shocked up, and giving vent to his well-known call of *Killy—Killy—Killy—Killy—Killy*, we may be sure that he is in quest of the first field mouse that has the temerity to show itself. Note how he checks himself; and, suspended over one spot on quick-wavering wing, his piercing eyes have detected the unhappy mouse below. Down he comes in a graceful swoop—and the distant squeal of the unfortunate rodent is distinctly heard.

On account of this wavering flight, many people have applied the name of "windhover" to the Sparrow Hawk; and, as it is a vernacular name with a reason for it, we may let it go at that. This also applies to calling it the "Kitty hawk," while, as already remarked, it has been given not a few other common names.

In Florida the Sparrow Hawks are said to be smaller than the more northern species, while there are also desert forms of them in the western country; descriptions of these will be found in most works presenting popular accounts of our raptorial birds.

As pointed out in a previous paragraph, the Sparrow Hawk in captivity makes a very engaging little pet. To

bring this about, not a little patience must be exercised—above all else no end of well-directed tactfulness and kindness. As a matter of fact, the history—both written and traditional—of the attitude assumed by man toward any or all of the animals below him in the biological scale, is responsible for the behavior of any particular one of them, with respect to the development of gentle-



GREAT OR BLUE LOBELIA IS A RELATIVE OF THE RED CARDINAL FLOWER, BOTH BELONGING TO THE *Lobeliaceae* OR LOBELIA FAMILY

Fig. 6—It is not difficult to recognize the bright blue flowers of this plant (*L. siphilitica*), of which the example here shown is an average specimen.

ness or ferocity. This applies to the lowest as well as the highest forms, or we might say from insects to the higher apes inclusive. Our literature on this subject—which is both interesting and important—is, as yet, not very extensive. The subject is deserving of far more study and close attention than it has received up to the present time. No one of the vertebrate groups furnish better illustrative examples of all this than do birds. For many years past there has been almost a universal movement on foot to encourage the matter of good fellowship between many species of our small land birds and our own species. At first only a limited number of people entered the field to bring this relationship about where possible, and it was chiefly accomplished through placing attractive foods for them in convenient places out-of-doors; through the establishment of bird homes in the trees and elsewhere, and the feeding of many birds in the wintertime at close quarters in the

open. At this writing this is a very common practice all over the country, and it is truly remarkable to

note the beneficial and most interesting results.

Many explorers of new lands have frequently noted how tame all the birds were that they came across in places previously entirely unknown to man. It was as true of land birds as of the marine forms or the so-called water birds. One traveler was returning from a spring with a small camp pitcher in his hand filled with water, when some bird, about the size of a robin, came and lit on the brim of the vessel to get a drink for itself. This was on one of the East Indian Isles; and if memory fails me not, the explorer was Alfred Russel Wallace.

But the literature of exploration teems with such accounts, though, unfortunately, examples of the kind are becoming more and more rare. Through the use of traps



Fig. 7—The Sparrow Hawk is one of the handsomest of our American Hawks.

and guns and persistent persecution of many kinds, nearly all—indeed all the various species of birds in this

country have become extremely distrustful of man. This applies to the representatives of every avian group, from loons to bluebirds; and it is a crying shame that the unfortunate relationship can so easily be proven to be true.

Now, the true raptorial birds and owls form no exception to the above rule, and our little Sparrow Hawks, referred to above, would seem to be especially susceptible to kind and gentle treatment. They make, as stated before, very interesting not to say charming pets for those who have a leaning toward keeping any of our native birds in captivity. A Sparrow Hawk may be kept in a good, roomy cage, or in some place where it can enjoy its outdoor freedom at will. In the latter instance, the bird has been known to return home to roost every night, and to come to call if within hearing. Finally, it will delight in flying down to rest upon your hand or shoulder, to receive any food you may have for it. No doubt, if kept in a large "flying cage," a pair of these birds would breed in captivity. The young are at first feathered with a full plumage of pure white down, and it is a long time before they assume the plumage of either of the sexes when adult. All of this part of their history, with numerous illustrations, I have published in other connections many years ago.



Photograph by Western Newspaper Union

WOMEN FELLING TREES NEAR PETWORTH, ENGLAND

One of the many unusual tasks performed successfully by the women of England was the felling of trees. This picture shows a group of happy workers drawing the felled logs to a train where they were loaded by other women and sent off to the mills.

AN Associated Press dispatch from Birmingham says: Canes of walnut from a tree which stood in front of the Birmingham meeting house before the battle of Brandywine, have been made by a local concern. They were sold at a bazaar for the benefit of war hospitals.

Other canes were sent to French war officials as mementoes of General Lafayette, who was wounded almost within the shadow of the tree.

One cane made of a selected piece of the tree has been sent to M. Jusserand, the French ambassador at Washington.

ACKNOWLEDGEMENT OF CHRISTMAS BOXES

The following cordial letter has been received by the Welfare Committee for Lumbermen and Foresters in War Service thanking the Committee for what was done for the boys at Christmas:

"American Forestry Association,
Washington, D. C.

December 31, 1918.

Gentlemen:

I have just received your cablegram announcing that 200 additional Christmas labels from forestry troops in France, received too late for the shipment of boxes, have been responded to with Christmas cards and a very generous money gift. The American Forestry Association has certainly been a most generous and warm-hearted Santa Claus for the forestry troops in France at this Yuletide period. I wish to thank you in behalf of the men in the 10th and 20th Engineers and the other troops working with them; and I assure you that we will all carry very grateful memories of the friendship and interest shown in our work and in us personally by the Association.

Very sincerely yours,

Lieutenant-Colonel Engineers." (Signed) A. B. GREELEY,

TO PURCHASE ADDITIONAL LANDS FOR EASTERN NATIONAL FOREST

THE National Forest Reservation Commission has just approved for purchase 54,744 acres of land for national forests in the White Mountains, Southern Appalachians, and Arkansas.

The largest tracts purchased are in Georgia, where the resumption of purchase work has been authorized by the commission. An aggregate area of 38,108 acres in Rabun, Union, and Townes Counties, scattered through 39 tracts, was approved for purchase at an average price of \$7.22 per acre.

In Alabama, in Lawrence and Winston Counties, 5,159 acres were approved at an average price of \$4.30; in North Carolina, in Macon and Buncombe Counties, 1,940 acres were approved at an average price of \$4.30 an acre; in Virginia, in Augusta and Shenandoah Counties, 1,381 acres were approved at an average price of \$4.36 an acre; in West Virginia, in Hardy County, 40 acres at an average price of \$7.00 an acre, and in New Hampshire, in Grafton and Coos Counties, 9.04 acres at an average price of \$6.68 an acre.

In Arkansas, 7,269 acres, located mainly in Polk, Pope, Johnson, and Garland Counties, were approved for purchase at an average price of \$3.61 per acre.

To date the National Forest Reservation Commission has approved for purchase 1,702,534 acres for national forest purposes in the 17 areas of eastern national forests.

HOW WOOD COMPARES WITH COAL IN HEATING VALUE

In heating value one standard cord of well-seasoned hickory, oak, beech, birch, hard maple, ash, elm, locust, or cherry wood is approximately equal to 1 ton (2,000 pounds) of anthracite coal, according to estimates by the Forest Service, United States Department of Agriculture. However, a cord and a half of soft maple and 2 cords of cedar, poplar, or basswood are required to give the same amount of heat.

One cord of mixed wood, well-seasoned, equals in heating value at least 1 ton of average grade bituminous coal.

THE USES OF WOOD

WOODEN ARTIFICIAL LIMBS

BY HU MAXWELL

Editor's Note.—This is the ninth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

THOSE who compile statistics of the artificial limb industry usually include crutches; and occasionally canes and surgeons' splints are likewise included. A similarity of purpose exists in all articles of this class, but there are several differences in the processes of manufacturing as well as in the materials used. Wood is common to all, but the different articles require woods of different kinds. There is less reason for including canes than crutches; for most canes are not employed by persons as an assistance in walking, but rather for the sake of fad or fashion; but crutches and artificial limbs are used by disabled persons exclusively. In consideration of

demand for crutches and limbs will continue long after peace shall again be restored.

The limbs wear out and crutches break and must be frequently renewed. The export of artificial limbs from this country is not large, neither are the imports. Shortly after the beginning of the present war, when it became apparent that many maimed men would return from the battlefields, limb manufacturers in the United States established branch houses in some of the European countries, ready to serve the unfortunates who might lose legs or arms. It is preferable but not absolutely necessary that the manufacturer of a limb shall make personal



TYPICAL WHITE WILLOW TREES

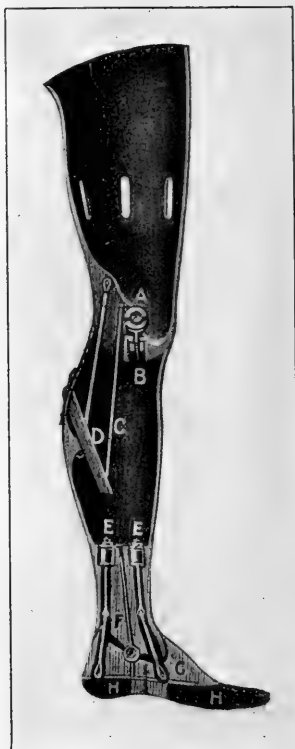
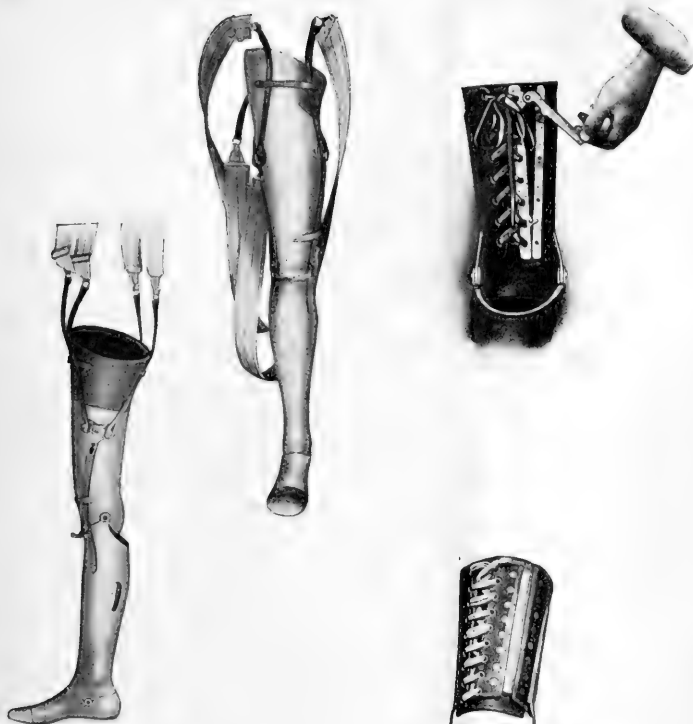
Nearly all of the white or English willow wood that furnishes wood material for artificial limbs grows in city parks and on road sides, where the trees were planted for shade and ornament. The trunks are usually thick and short, and the larger they are the better the wood is. The photograph from which the above cut was made was taken in a Chicago park.

that fact, the present article will class crutches and false limbs in the same industry but will exclude canes. That is the treatment accorded the subject by the United States Forest Service.

The total bill of woods consumed annually for limbs, crutches, and splints in this country, according to government statistics, is 687,980 feet, board measure. That compilation was made prior to the beginning of the present war and represents an average consumption in normal times. Without doubt, the industry has grown much since, and many years must pass before it again falls as low as it was in recent times of peace; because the

measurements and supervise the fitting and adjustment. Several leading American manufacturers have established finishing factories in the allied countries. These factories are supplied with artificial limbs in quantities from headquarters in the United States. The fitting and finishing work on these limbs is done at the finishing factories, where each limb is adapted to the individual requirements of the wearer. The finished article has never been exported in quantities, nor is it practical to do so.

Some of the warring governments supply cheap legs for their crippled soldiers, but they are of iron, and little or no wood enters into their use. Possibly after



WOODEN LEG WITH JOINTS

This illustration gives a good idea of the shell and the internal mechanism of a wooden leg of the latest design. Nature is imitated as closely as possible, and the lightness of the limb is surprising. It weighs only a few pounds and there is not an ounce of superfluous material in it. From the catalogue of the Pomeroy Company, New York.



FACTORY-MADE PEGLEGS

Sometimes the pegleg without the ankle joint is preferred or is considered necessary, but the old club that was made on a turning lathe or with a drawing knife has been displaced by a wooden limb which is light, serviceable and artistic in appearance. Some of the modern patterns are shown in the above collection from the catalogue of a well-known manufacturer.



the war the various governments may furnish their soldiers with limbs as a part of the pension system. Following our Civil War, our government supplied 100,000 artificial limbs to disabled soldiers and sailors, and the practice of supplying them was kept up during several years. The Congress passed legislation in the fall of 1917 known as the War Risk Insurance Act. One of its many commendable features was a provision accompanied by an appropriation for the supplying of artificial limbs to amputated soldiers of this war. It is the policy of the War Risk Insurance Bureau, I am informed, to supply the permanent



HE CAN FIRE AN ENGINE

A man with an artificial leg is not necessarily debarred from occupations which might be considered impossible. The accompanying pictures give scenes from real life, though rather rarely encountered. The power of the will has as much to do with it as the power of the wooden leg.

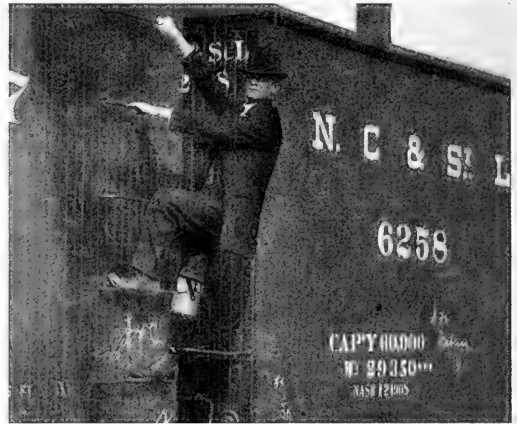
artificial limb as soon as the amputated man is prepared for its use.

Between 125 and 150 firms making limbs carry on business in this country. Some are large establishments employing factory methods and operating on a fairly extensive scale, while others are small, giving employment to only a few persons, and doing a large part of the work by hand. It is a business that can be carried on in a small way without calling for much capital, though it is capable of enlargement without limit.

The average life of an artificial limb is about eight years, and repairs are frequently necessary during that time, for accidents befall artificial members as frequently as those which nature provided the wearer, but with this difference, the limb which nature gives does not wear out, while the man-made substitute is a machine which is not guaranteed to bear its burden and do its work for four score years and ten. There are differences in these machines as there are in machinery of other kinds. Some are better than others. Each manufacturer persuades himself that his product is best, and he tries to persuade

others that such is the case. More than one hundred and fifty patents have been issued on artificial limbs in this country, and nearly every patent is backed by an owner or agent whose business it is to push the article by all fair methods. That helps to account for the numerous claims of superiority by different manufacturers. Some of these claims are doubtless urged more strongly than is warranted by real merit; yet the fact cannot be disputed that many ingenious and valuable devices are in use and that frequent improvements are being made.

It remains a fact, none the less, that most manufactured limbs have their weak places and that not one has yet been invented that equals nature's own device. The joint is the hard part to imitate. The natural joint is a wonderful piece of mechanism and it defies all imitations. The manufactured product may have joints modeled after nature with the most painstaking care; yet the most enthusiastic manufacturer does not claim that he can make an ankle joint as good as the real article. The nearer it copies nature, the more complex it becomes and consequently the more liable it is to get out of order. Even the natural ankle is sometimes sprained and put out of commission for days or weeks at a time, and the artificial is still more liable to meet mishaps. A doctor may charge twenty-five dollars for repairing a displaced ankle



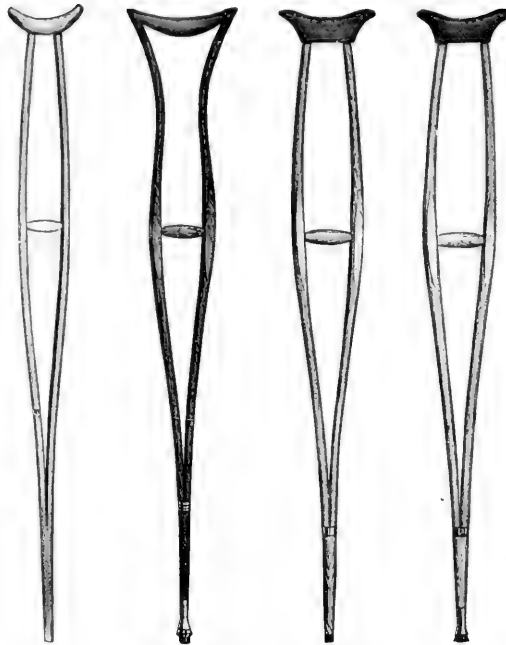
WOODEN LEGS MAY BE USED IN CLIMBING

bone; and it is no reflection on the manufactured article if it calls for repairs that cost money. Some such joints may cost twenty-five dollars in a year in repairs, or twice as much as the natural foot costs in shoes. A repair bill of that size, however, is declared to be excessive by the makers of some of the best artificial ankle joints. The case is said to be similar to that of an automobile which may go a long time without any cost for repairs, and then run into a streak of bad luck.

A high grade wooden limb consists of more parts than a casual observer would suppose, and most of the patents cover details rather than the general form of the limb. All efforts are directed toward imitating nature as nearly as possible in form and movement. So close is the imitation in some cases that the wearers of artificial

limbs conceal the fact from all except their most intimate friends. Some wearers of such imitations can play ball, climb ladders, enjoy hunting and fishing, skate, and in many other ways take part in the affairs of business and pleasure. The catalogues of manufacturers of wooden arms and legs contain so many testimonials from wearers who seem pleased with the substitutes, that the reader is inclined to doubt whether they should be classed with the unfortunate. Much more is heard of artificial legs than of arms. That is because the loss of a leg is a much more serious matter than the loss of an arm, and the one-legged man is at a greater disadvantage in the ordinary affairs of life than the man is who has only one arm.

The false limb is not a modern invention. No one knows when the first came into use, but they are mentioned in writings hundreds, even thousands of years old. The beginnings were doubt-



THE OLD RELIABLE CRUTCH

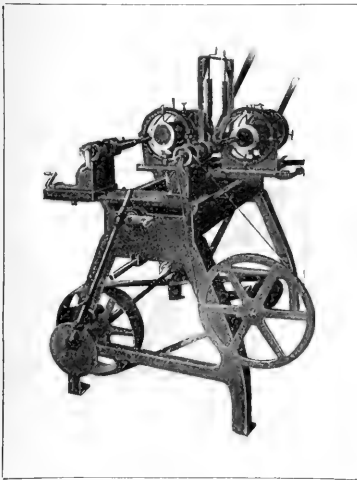
The crutch is considered to be an artificial limb and is so listed in statistics of manufacture. It has been called the first aid to the crippled. The article is made in several styles and the buyer may pay for style as well as for service.

wooden leg as a club to quell a belligerent lumberjack.

Nearly any wooden leg or arm can be made to perform one or two functions very well, and that was what was aimed at by makers centuries ago; but it becomes quite another problem when the attempt is made to produce a wooden leg or arm that can perform more than a few functions than a leg.

Some persons, on insufficient evidence, have made the claim that no

artificial arm is now produced that is as perfect as were some in existence centuries ago. That claim is based on written descriptions which are largely imaginary. A few ancient manufactured arms have come down to the present time, and are preserved in museums. Some of these arms are clever and ingenious, but they are not to be compared with the best product of the present time. They usually weigh twenty-five or thirty pounds, in contrast with the two pound weight of the best arm now made. According to some of the old writers, weight was desirable in an artificial limb, since the owner might want to use it as a weapon to knock out his foes in battle, and the heavier the better. That viewpoint is not wholly ancient, for a scene in a modern story has one of the characters in a Michigan frontier town using his



A LATHE UNIQUE IN ITS MECHANISM

There are lathes which shape gun stocks, shoe lasts, and wooden doll heads, but the above cut represents one even more specialized. It shapes the interior of wooden legs, down almost to millimeter measurements. Few machines equal it in accuracy of work. It was invented by the J. E. Hanger Artificial Limb Company, Washington, District of Columbia.



THE FIRST FACTORY OPERATION

This crudely shaped block of English willow is the raw material with which the artificial limb maker does his best work. It is the first stage in the process; but before it has advanced thus far, the wood has undergone many months of air seasoning, for the workman must not touch it until it is in perfect condition.

duce something that will take the place of nature's handiwork generally. The bones, flesh, tendons and cartilages, and particularly the nerves, of the natural limb do specialized work which the best substitutes can seldom equal.

The best kinds of artificial arms weigh from one to two and a half pounds; legs from four to seven pounds. The lightest are for small persons. In a few instances legs are manufactured for children less than two years old, and for persons eighty or more. When limbs are fitted on a person who is growing rapidly, frequent changes are necessary.

The cost of limbs varies so widely that it is impossible to name an average; but the prices quoted in the catalogue of a well known manufacturer of these articles range downward from \$150. The size of the artificial limb does not govern the price so much as it is governed by the kind of workmanship employed in its manufacture and by the patented devices used. The rough material is not expensive. A few pounds of wood, a little leather, rubber, steel, and shellac constitute the materials, but the labor that forms and fits them is expensive and is responsible for the principal items of cost.

Different manufacturers advertise special features of their product and claim high value for certain devices. Competition is keen, and the unfortunate person in need of a limb has many offers from which to choose; but

there is not much difference in the range of prices for similar articles.

The cheapest and crudest artificial leg is the wooden peg which is strapped in place and can be made by any carpenter or turner for a few dollars. This is the historical peg that figures in chronicles, romances, and

poetry. The comic supplement artists who illustrate Sunday papers equip the pirates and hoboes with legs of that kind. The Dutch governor of New York, as Washington Irving described him, was better known by his peg leg than by any other possession or attribute; and a stanza in Hood's "Faithless Nelly Gray" is sometimes selected by authors of school grammars

to test the pupil's proficiency in parsing ambiguous syntax:

"The army surgeon made him limbs;

Said he, 'They 're only pegs,

But there 's as wooden members quite
As represent my legs.'"

The peg is practically indestructible. It has no springs to snap or joints to rattle, and time, wear, and tear make little impression on it.

There is no hand-made arm quite as simple and substantial as the pegleg; but there is a peg arm also, and it is equipped with a hook in place of a hand. A character in Dickens' "Dombey and Son" wore one. That was the old, cheap makeshift; but modern inventors have produced one with the hook equipment, and it is by no means a cheap makeshift. Among the high-class manufactures in this line is an arm equipped with two hooks operated by springs and bands, the forms and movements apparently having been suggested by the mandibles of a stag



THE ALPHA AND OMEGA OF
SUBSTITUTES

The prehistoric pegleg and its latest rival. The old is much better than nothing, but it is distanced in appearance, convenience and efficiency by the articulated member made of willow wood, metal and rawhide. The illustration is from the catalogue of the True Artificial Limb Company, Niagara Falls, New York.



THREE STYLES OF WOODEN LEGS

That on the left is a limb not extending above the knee; the next has the knee bearings, and the next is the artificial limb extending above the knee. Each is provided with its own peculiar and necessary mechanism and fittings to conform to differences in pattern. Photograph by courtesy of True Company.

beetle. The hinged hooks are so accurately adjusted that the wearer of the arm can use them in picking up a glass of water and drinking from it. When the hooks are not in use they may be concealed by slipping a hollow hand over them. This and other devices emphasize the skill, patience, and ingenuity of manufacturers in producing limbs as nearly as possible like the natural members.

Some controversy has arisen as to the origin of the word "cork" as applied to a limb. Most people are under the impression that the name implies that such limbs are made of cork, or that they are as light as cork. The latter meaning is reasonable, but the assumption that limbs are now made, or ever were made, of cork has no basis in fact. Cork is nothing more or less than the bark of a species of oak tree that grows in southwestern Europe and in northwestern Africa (*Quercus ilex*). It is too weak for use as artificial limbs, and if it were otherwise fit, it could not be had in pieces of sufficient size. The name of the limbs is said to have originated in a quite natural way, and refers to the town of Cork in Ireland where once they made artificial limbs of excellent quality. The town gave its name to the product.

In the manufacture of such limbs different materials are employed, rubber, leather, steel, felt, and wood, and

the most important of these is wood. More than one wood is serviceable, but there is one which is usually rated far superior to all the others, and it holds undisputed first place in the industry, though the government's published statistics apparently prove the contrary. These

statistics fail to make it clear that some of the woods shown in the figures are for crutches rather than for limbs proper. White or English willow (*Salix alba*) is the wood par excellence for manufactured limbs. It is frequently listed as red willow, but that is not strictly correct, for red willow is a different species, a native of this country, while white willow is foreign, though it has been so widely planted in the United States that it is plentiful in many regions.

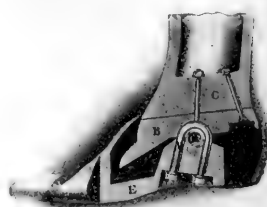
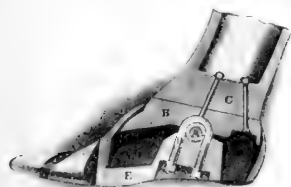
White willow is essentially a town and highway tree. It occurs in parks, in yards, on street borders, and along highways where it casts delightful shade and forms a pleasing feature of the summer landscape. Being an open-ground tree, and usually not much crowded, it develops a short trunk and an enormous crown. The tree seldom furnishes more than one short sawlog, and the logs range in diameter from one to two and a half feet. Old trees may be three feet in diameter, and in extreme cases six feet. The larger the tree the better the wood for artificial limbs.

Thus it is that the supply of wood for artificial limbs



PROGRESSIVE STAGE IN LIMB MANUFACTURE

The blocks of willow wood have been roughly shaped and mounted in order to adjust the proportions preparatory to the final cutting and the finishing touches. Much of the work cannot be done by machinery, but must be perfected with carving tools used by hand. This photograph was obtained through the courtesy of Pomeroy Company, New York.



WOODEN FOOT IN ACTION AND AT REST

This illustration gives an idea of the articulation of the wooden foot and its action during the process of walking and standing still. The inventors have devoted their best thoughts to the perfection of an ankle joint which will not only act naturally, but will endure the severe strains to which it is subjected.



comes almost wholly from planted trees. Few of them were planted in expectation that they would ever come into market for lumber. They have never been regularly taken by lumbermen; but a few logs have been cut here and a few there when streets have been widened or parks cleared. The supply of willow wood from that source has generally been ample, but now, because of the war, the demand is much greater than it was formerly, and it may be anticipated that the search for suitable willow for limbs will continue for years, and no one who has trees of this wood should permit them to be destroyed but should try to dispose of them to manufacturers of limbs.

White willow that goes to factories often causes damage to saws and other tools that are employed in working it. That is done by metal in the wood. Such is a common fault with much wood that is cut from trees which have grown about residences and in the vicinity of barns and near fences. While such trees are growing they are



YUCCA PALM IN THE MOHAVE DESERT

The photograph of this strange tree was made available by the courtesy of the United States Forest Service. The scene is in southern California, where these uncouth trees, which look like specimens from the Carboniferous Age, are furnishing splints used by surgeons in setting broken bones. The equivalent of 40,000 board feet is cut annually.



RAW MATERIAL FOR SURGEONS' SPLINTS

A section of the trunk of the weird yucca palm is being prepared for the factory where it will be converted into sheets of veneer to be cut into splints for binding broken bones. These by tens of thousands are now being sent to Europe for use in the army hospitals. The sheets of wood look like lace and are as strong as horn. Photograph by the United States Forest Service.

apt to be made use of as fence posts to which to nail boards, or as posts on which to hang gates; or the planks which form sheds are nailed to them; or they may have been equipped with hammock hooks. The metal driven into the trunks remains there until the saws find it when the wood is passing through the mill or shop. The growth of a few years completely hides all trace of the metal until the logs are opened. Experienced sawmill operators do not like to handle timber that has grown in cities or towns or near barns or residences because of the hardware concealed in the wood.

White willow did not become the leading wood for limbs by any accidental choice. It was proved by trials and experience, and only after it was found to be the best was it admitted to

first place. It possesses certain characteristics that are wanted, and it has them in a higher degree than any other known wood. It is light in weight, a requisite which cannot be insisted upon too strongly; it is very tough, not easily split or splintered under blows and twists, and not apt to check or warp in process of seasoning. After it has become dry it shrinks and swells but little. The pores in the wood are very small and impurities are not readily absorbed. It cuts easily, and therefore lends itself readily to the shaving and whittling which the manufacturer must do in converting the rough billet into the finished limb. Some of the cutting is done by machinery, but much is hand work with special tools, in hollowing the inside and shaping the exterior. The limbs are hollow. They are thin shells, and willow wood is so tough and strong, in proportion to its weight that the shells can be whittled very thin. They are then covered with raw hide, the kind of leather that forms the heads of drums, and the final coat of varnish is applied to the leather. The necessary metal and other fastenings can be affixed securely to this thin shell.

The breaking of a wooden leg is a serious matter, though not so serious as the fracture of a bone of a natural leg, and it is less painful; yet some pain of a pecuniary kind may be occasioned by the knowledge that a broken willow leg may cost a hundred dollars in repairs.

The suggestion has been made that false limbs might be made of woods other than willow; and so they might be and so they have been. Willow is not the lightest wood in this country. A dozen others are as light or lighter; but lightness is not the sole quality to consider. If it were, the first place among American species would go to Missouri corkwood (*Leitneria floridana*), and tupelo roots would be available, and also the golden fig of Florida, or several of the cedars. But, on account of undesirable physical qualities, not one of these is a rival of white willow in the wooden limb industry.

Many attempts have been made to find substitutes for wood; not that cheaper material is wanted, but in some instances it is difficult to fit a wooden limb satisfactorily and other materials would be more convenient. That none of the substitutes has been wholly satisfactory is evident from the fact that wood continues to be the most widely used material for manufactured limbs. Gold has been mentioned among other substitutes, but perhaps reference to that precious metal in Thomas Hood's poem was not meant to be taken seriously. If gold were as

cheap as willow, it still would not often be employed for this work, because it is too heavy and too weak. Aluminum would be better than gold, but it has had little use, although it is claimed that the former German Emperor's withered arm has been concealed inside a hollow aluminum mechanism that passes for an arm.

Fashion has more to do with false arms and legs than might be supposed. Some wearers are as proud of theirs as smokers are of favorite pipes, or sportsmen of guns which break records, or fishermen of reels which land the largest and gamest fish. Some patrons of the limb factories buy new arms or legs nearly as regularly as they buy new clothes; not that the old are worn out, but fashion, as they think, demands new outfits at regular intervals. Besides, it is good foresight to have a new member ready for use if the old should become incapacitated by accident.

Crutches are with reason included in the limb industry, for both are put to the same use in assisting cripples to carry on the affairs of life; but the points common to the two products go little farther than the methods in which they are used. The processes of manufacture are different, so are the woods employed.

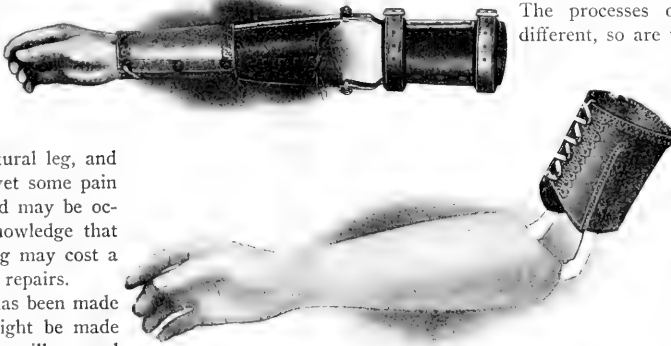
The crutch maker needs very hard and very strong woods, and weight is not objectionable; but the limb manufacturer must have light wood, yet it must be strong, and he has few species to choose from. The crutch maker has a pretty wide field of choice.

New Hampshire leads all other states in the pro-

duction of crutches so far as statistics show. Birch and maple, which are excellent woods for crutches, are abundant and of fine quality in New Hampshire. Choice woods like cherry, rosewood, and lancewood, find a place, the first two as handles or grips and as tops to fit under the wearer's arms, and lancewood, because of its strength, becomes the shaft. New Hampshire produces about 250,000 pairs of crutches a year. The best grades are made of sugar maple with rosewood handles.

If canes were admitted into the artificial limb industry, the number of woods to be listed, and the total quantity, would be much increased. Cane makers consume about 2,000,000 feet of wood a year, in addition to some woods which are never measured in feet, such as weitchel, bamboo, and nannyberry.

The wearing of artificial limbs is not restricted to any condition of life, to any size of persons, or to any age.



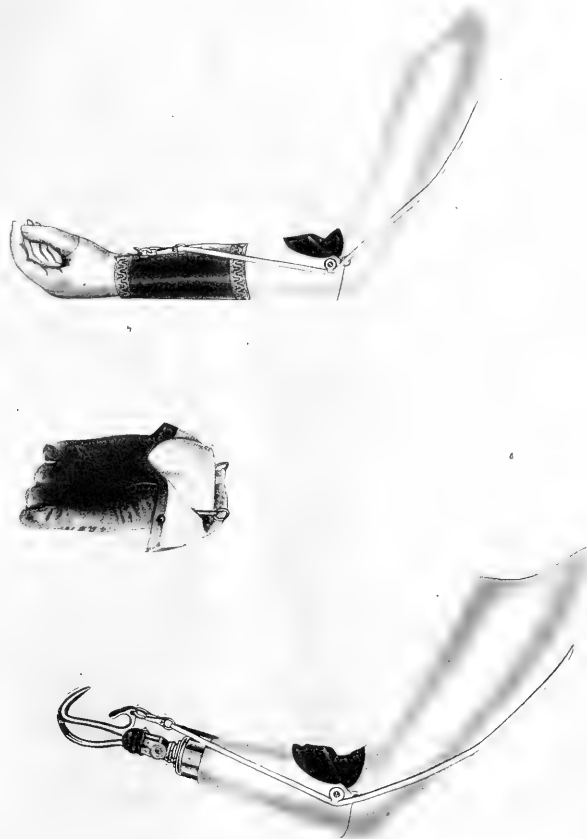
THE MECHANISM OF ARTIFICIAL ARMS

Inventors have worked faithfully on the problem of producing acceptable substitutes for the human arm, and the accompanying illustrations show some of the results of their genius and labor. The problem has many angles that must be taken into account, and many ideas have been successfully developed.

The unfortunate rich open their purses to buy the best that skill and experience can produce, and the poor man is able to purchase serviceable substitutes for lost members.

The surgeon's splint deserves a place in the industry. It is a wooden patch on nature's limb rather than a wooden substitute. Many woods can be worked into splints, but complete figures giving kinds and totals appear to be lacking; but one excellent wood has been listed. It is the yucca palm of California and Arizona, *Yucca mohavensis*. It is a peculiar tree, a hardwood that belongs to the lily family. It develops no annual growth rings, its trunk consisting of woody fibres and soft tissues. Splint makers reduce the trunk to veneers which are then cut in strips of the desired size. The strips look like lattice-work or coarse lace. The wood is very stiff, strong, and light, and is an ideal material for splints. The yucca is a desert tree. Its trunk may attain a diameter of a foot or more. Its dark, branches, and leaves are ragged, suggesting in appearance the extinct trees of the Carboniferous Age. Fortunately, a use has been found for the wood, other than as posts for sheep corrals near the water holes in the deserts where this palm ekes out its precarious existence. Nearly 40,000 feet, board measure, or ten times that amount if the surface of the veneer is measured, are yearly converted into splints for reducing broken bones.

Mention has been made of government statistics of the woods reported by the manufacturers of limbs and that in these figures the limbs, crutches, and surgeons'



splints are grouped in the same industry. It is possible to segregate the woods, with fair accuracy, according to their uses. The following table lists these woods

and the quantity of each used during an average year:

Birch.....	353,000	feet
Maple.....	147,000	"
Willow.....	50,170	"
Hickory.....	40,000	"
Yucca.....	39,800	"
Lancewood.....	30,000	"
Rosewood.....	10,000	"
Cherry.....	10,000	"
Total.....	686,980	"

The birch, maple, hickory, lancewood, rosewood, and cherry in this list are made into crutches; yucca is used for surgeons' splints, while the willow and basswood go to the limb makers. Perhaps some of the hickory is used for small pins in ankle and knee joints. Some manufacturers attach ligaments and springs to such pins.

(Editor's Note: AMERICAN FORESTRY MAGAZINE is indebted to the Hanger Artificial Limb Company, of Washington, for many of the illustrations in this article.)

THE NATIONAL ARMY AND TRAINING IN FORESTRY

BY JAMES W. TOUMEY, DIRECTOR YALE FOREST SCHOOL

IN THE rapid industrial progress of the United States during the past half century there has been an increased appreciation of the necessity for forest management if wood supplies are to be maintained in adequate amount for our future needs and vast areas of our non-agricultural lands be kept in productive condition instead of becoming areas of desolation and waste. Without scientific management woodlands rapidly deteriorate and lose their productive capacity, so much so that the yield of useful materials from them is reduced to one-third or even one-quarter that which they are capable of producing when well organized and managed.

The forests of the country embrace approximately 550 million acres or about 29 per cent of the total area. In order that the wood supply of the future may be adequate for our needs all of this vast area, with the exception of the comparatively small part capable of development for agricultural use must be maintained in forest and organized for protection and permanent economic management. Although the progress made by the U. S. Forest Service, the forestry departments of the several states, educational institutions for training in forestry and local forestry organizations has been considerable in recent years, as yet only a beginning has been made and we have a long way to go before there is at large a real appreciation of forestry and the need for its application on our absolute forest land, which is one of our great basic resources if this land is maintained in reasonable productivity and continues to perform its just function in our economic development.

Not only is there great present need for a wider knowledge of forestry and its application by those living on the land, due to the necessity for insuring a necessary future supply of wood but due also to the importance of vast supplies of timber in national defense. The world war has shown more clearly than ever before the dependence of modern warfare upon timber. The forest capital of France has been of prime importance in the defeat of the Central Powers. Modern war is a conflict between national resources brought into use by the contending armies. The country without these resources, of which wood is one, is defeated before the battle is begun.

The great and far reaching opportunity presented for industrial and technical education in the American army during the long period that must necessarily ensue be-

tween the declaration of peace and re-embarkation must be utilized to its fullest extent. The plan now in progress of organization under the auspices of the Y. M. C. A. is in the hands of a commission in whom the American people have the highest confidence. It is the function of this commission, assisted by eminent educators, to determine the character and extent of the facilities placed at the disposal of the soldiers of the American Army in France. In providing the facilities for education in the army forestry training should be given a conspicuous place.

In all probability when peace terms are signed there will be an American army in France of one and one-half million men or more. It will likely take many months to return these men to this country and fit them into industrial and other work. Of this number between five and six hundred thousand were recruited from the land, where they were engaged in the production of farm and forest crops and likely will want to return to the land after the war. Most of these men have some knowledge of agriculture but few have a real appreciation of forestry and the possibilities of its development in their own communities. It is believed if educational facilities in forestry are approved a considerable proportion of the army recruited from the land will avail themselves of the opportunity to gain a knowledge of the subject adequate to apply its principles to the future management of the woodlands in their respective communities. In the writer's judgment no equal opportunity has heretofore arisen to stimulate the practice of forestry in this country.

The inquiry naturally arises if forestry education is provided for those members of the National Army that desire it during the period between the declaration of peace and re-embarkation, can the instruction be made of such a nature when given in France that it can be applied in this country and be of real use to the returning soldiers? It is believed that the instruction in forestry should be definitely organized and for the greater portion of the soldiers electing this study, it should center in silviculture, namely, the methods of handling the forest in order to attain successful natural or artificial regeneration and the improvement of the stand through the various methods which add to the quality or yield of the product. Emphasis should be placed upon forest protection and there should be a course of lectures upon the place of forestry in our national life and in our economic

development. For the most part the instruction should be in the form of field work under personal supervision by practical foresters. In this connection it may be added that French forests, due to their long period under management, afford much better illustrations of the results of silvicultural treatment than forests in this country, none of which have been organized for forest management except in recent years. In the forests of France that have not been destroyed or seriously over cut or injured due to the war may be found every stage in the life of managed stands. The results of silvicultural operations executed in the past are expressed in the present condition of stands. For the above reasons selected French forests are admirable for demonstrating on the ground the results of every phase of silvicultural treatment.

The large numbers of American soldiers that will elect the study of forestry if opportunity is afforded will not only have a vast and far-reaching effect on forestry in this country but the work can be made to perform a large service in rehabilitating many of the forests in France that have been injured or destroyed by the war.

If the instruction in forestry provided for the army serves its best purpose it should consist largely of field work under supervision, where the men are taught the art of forestry through the actual performance of work in the woods. The field work necessary in the conduct of the training can be made not only of educational value but its importance to France should be fully appreciated. Not only can improvement work be carried out in forests now existing but many of those destroyed by war can be replanted as a part of the field work. As a practical illustration, if but 20,000 soldiers out of the one and one-half million or more men that will likely be in France at the close of hostilities should elect to study forestry prior to re-embarkation, this body of men in pursuit of their practical experience in forest planting could plant approximately 10 million trees in a single day and thus reestablish stands of timber on at least 8,000 acres of devastated France. It is assumed that the planting stock available in France for artificial regeneration is so limited in amount that it would be desirable to supplement it by suitable stock available from this country. Last spring the Pennsylvania Department of Forestry through the Governor of Pennsylvania offered to the French Government a gift of four million forest tree seedlings from the State Forest nurseries. It is believed that at least 10 million forest tree seedlings are available in the forest nurseries of eastern United States, many of which are suitable for planting in France. Those suitable for foreign use and growing in state or other publicly owned nurseries can very likely be secured for overseas use at little or no cost.

More than 1,400 American foresters are now in the United States Army in one capacity or another. Approximately one-half are graduates of forest schools or were students in forest schools when the United States entered the war. It is evident that if the instruction in forestry provided for American soldiers is organized with foresight and definitely planned for without delay

and the American foresters now in France organized into a teaching staff to take charge of the work at many centers as soon as peace is declared much can be accomplished of real value to the soldiers themselves and of great future value to this country. At the same time a vast work could be performed in the rehabilitation of French forests.

SALE OF OF SURPLUS FARM TIMBER ADDS TO CASH RETURN FROM LAND

TEN helps in marketing woodland products, summed up in the accompanying chart, should be carefully considered by those desiring to sell timber. These aim to bring the producer in touch with the consumer so as to market as direct as possible. High-grade logs of white oak, yellow poplar, red gum, ash, cherry, black walnut, etc., in most cases can be sold direct to the manufacturing plants, although located at considerable distances. Local wood-using plants usually buy in lots as small as wagon or truck load, but not less than a carload lot can be sold profitably for shipment.

In most sections of the South the farms have sufficient woodland for the best welfare of the farm, but in a few districts like the "black belt" and intensive tobacco grow-

TEN HELPS IN MARKETING WOODLAND PRODUCTS

1. Get prices for various wood products from as many sawmills and other wood-using plants as possible.
2. Before selling, consult neighbors who have sold timber and benefit from their experiences.
3. Investigate local timber requirements and prices. Your products may be worth more locally because transportation is saved.
4. Advertise in papers and otherwise secure outside competition.
5. Secure bids if practicable both by the lump and by log-scale measure.
6. Be sure that you are selling to responsible purchasers.
7. Get a reliable estimate of the amount and value of the material before selling.
8. Market the higher grades of timber and use the cheaper for farm purposes.
9. Remember that standing timber can wait over a period of low prices without rapid deterioration.
10. Use a written agreement in selling timber, especially if cutting is done by purchaser.

ing sections, the timber has been mostly cut, and owners are obliged to buy firewood and lumber, posts and rough timbers for the upkeep of their farms. Where there is an excess of wooded land and growing timber above the permanent needs of the farmer timber becomes an important product, to be sold in many cases from land cleared to make openings for more field crops or pasture. The farmer's interest centers naturally in the conservation and disposal rather than the production of timber. Much of the grown timber was on the farm when the present occupant came into its possession. In the case of the ordinary field crops and live stock, however, which mature in from one to three years, production usually is the prime consideration.

CONTROL OF PRIVATE FOREST CUTTING

BY W. DARROW CLARK

PROFESSOR OF FORESTRY AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

FOR the last two decades foresters and other advocates of forestry have talked and written abundantly on the various arguments favoring the cutting of forests in accordance with forestry principles, with a view to the future crop.

Are we not now offered the psychological time to pause, take account of results, and determine whether or not our past methods have been justified by these results?

So far as I am able to observe, the amount of privately owned forest land which has been cut in accordance with the teachings of forestry forms a very insignificant total when compared with the amount which has been cut in the same old "devil may care" way.

Although the writer does not possess the data necessary for competent judgment as to the results obtained on National Forest timber sales areas, yet he feels safe in assuming that in so far as they have been cut in accordance with the rules of the United States Forest Service, they have at least served in the nature of experimental cuttings made with a definite purpose and for obtaining definite results in the future crop. As such they will serve as stepping stones to better practice, while the cuttings on private lands can serve only in a haphazard way.

What, we may ask, is the reason for such a situation? The reason is both simple and apparent.

In the one case, the method of cutting was directed by Government experts. In the other case, the method of cutting was directed by the private owner, who very clearly lacks sufficient interest in the future condition of his forest possessions.

How, then, can the method of cutting on private lands be improved? Is the answer, "By Government Control?"

Certainly the current tendency is for the Government to step in and direct wherever private and public interests conflict.

Abstract principles affecting the rights of individuals have been suspended. Corporation owned railroad property has been taken over and is now being operated by the Government. Manufacturing plants and their output have been commandeered. The quantity of certain foods, and the quantity of fuel which the individual may consume has been limited. The amount of profits which may be made, and the amount made which may be re-

tained has been definitely limited. Verily, even men are drafted bodily and directed to do thus and so, and to go here and there. All this has been done for the welfare of the republic. Government direction of cutting on private lands will be in the direction of this tendency. Government ownership is not prerequisite. The United States Forest Service logically would be the directing center. The Eastern part of the country can be divided into districts, irrespective of State lines, similar to the western districts. A district office in charge of a district chief can be established in each eastern district, together with a corps of assistants. No cutting on private land would be permitted until the owner had made application to his district chief, and the chief in turn had specified the manner in which the cutting should proceed. In other words, the cutting would all be done under Government control just as is done on the National Forests.

Naturally, under this regime the office of the individual State Forester would become superfluous. In many cases there is little doubt that he would simply be taken over by the U. S. Forest Service. The State Forester would thus be freed from local political control, and accordingly he would be very much more independent in carrying out his policies for the best forest results. It might seem advisable in many cases to convert the State Forester's office into a State City Forester's office to direct shade tree and park work throughout the State. But these are the details. Is not the time ripe for some agitation as to the advisability of the adoption of this policy?

Let us have no misunderstanding as to what is the end sought, and what is the means to that end. Better conservation and reproduction of our forest resources is the end sought, and government control of all cutting is merely the means by which we may possibly attain it. It was never more apparent than now that the bone and sinew of a nation, its recuperative power, its power to come back after a devastating blow, lies largely in its natural resources. It behooves every man, woman and child of our nation to take heed of this fact. It is directly up to those who know what the present situation and tendency is to stand by their guns and to send this idea home to the people.

**WHEN YOU PLANT A MEMORIAL TREE WRITE AND TELL THE AMERICAN
FORESTRY ASSOCIATION, WASHINGTON, D. C.**

RENASCENCE OF THE MODERN MEETING-HOUSE

BY JOY WHEELER DOW

THERE is, at least, one bit of classic architecture that fits into the American landscape, perfectly.

It is the wooden, Colonial Meeting-house. Originally good in its conception, good in the honest application of American forestry to its lines and proportions, without the mistaken idea of counterfeiting stone-work, and invested now by three centuries of American history with irresistible personality and magnetism—who is not gladdened to see its spire and gilt cockerel shimmering afar in the glorious sunshine of America, as it

strange to say, there is no more danger of fire from the wiring and all our modern inventions which tamper with fire, and make insurance policies necessary even for those who dwell in monolithic concrete dwellings. The old Colonial dwellings rarely burned down. Then, there is the wide range of selection—different kinds of wood for the different parts of the building. Spruce and yellow pine are not the only framing material, although, white pine, I believe, is best for door and window casings, outside doors, cornices and mouldings.



A COLONIAL HOUSE IN SWITZERLAND

Gothic grammar correctly expressed in wood.

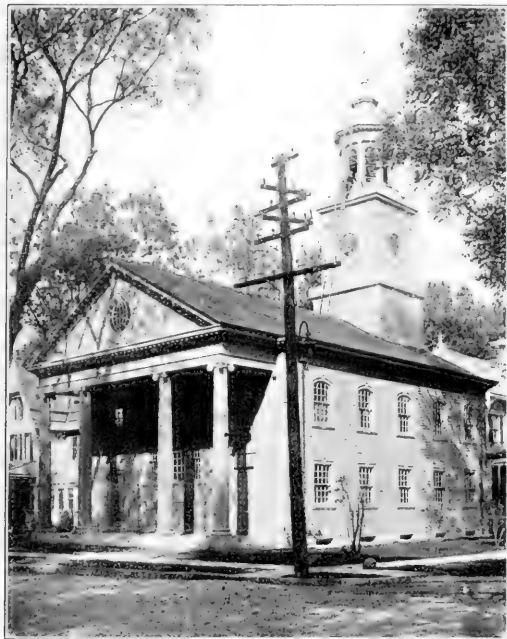
dominates the cluster of elms or maples of the village common in the middle distance of a picture of matchless rural scenery?

Besides these sentimental considerations, what kind of a building is more suitable for an all-the-year-round proposition in our land, than one constructed out of some kind of sound and time-resisting species of wood selected from our splendid native forests? A non-conductor of temperatures, a wooden building further insulated by back-plastering and double paper lining, is snug and warm in winter, cool in summer, while it harbors none of the insidious dampness which is apt to linger, at all times, in a house constructed of massive masonry; and

This should be leaded with a white lead base. Weatherboards, where there is an alternate choice of using cedar, cypress or some other wood, may be left entirely without paint, as was done in the Jacobean-Colonial dwelling called "Keepsake" illustrated in the March number of "American Forestry."

The first colonists had no paint, the few houses of that period remaining having withstood the vicissitudes of three hundred years without its help and for this reason it has always seemed to me, as a matter of personal choice, that it would be a good rule today never to stain or paint wood, obscuring its beautiful grain, if it can be avoided.

For the interior of our home, we may introduce the hardwoods—like oak or chestnut for the exposed ceiling timbers and partition timbers. Oak, maple and yellow pine play an important part for floors, only do not try to imitate the floors of bowling-alleys with excessively



THE EXTERIOR OF THE BUILDING

All Souls In-The-East, Unitarian Universalist, and voted by the Architectural League of New-York the ideal meeting-house of America.

narrow strips such as mill men often recommend in order to divide the inevitable shrinkages of their half-aged product as much as possible. Poplar is best, in this section of the country, for white paint and enamel trim, because the grain and color of the pieces are hard to match, while it is a soft wood requiring some protection. The Summit, New Jersey, Meeting-house illustrated, is trimmed with poplar, capped with birch rails. There are three-ply, built-up, birch doors, and a birch casing for the renaissance organ, all birch being cabinet finished, but without a particle of stain, depending solely upon time for deepening the tone values.

White paint is a bit harsh for the exterior of a meeting-house as rich in architectural detail as is this one, and in a city or large village, it soils too quickly and streaks horribly. There is, moreover, an indefinable charm imparted to Colonial buildings by soft browns and drabs. I cannot tell you why; but a subconsciousness suggests reminiscences of the subdued and grateful tones incident to the Italian travertine, as one reason, while another, possibly, is suggested by memories of the delightful belfry of old St. John's which presides over the docks of Portsmouth, New Hampshire, also the brown steeple of St. John's and St. Paul's, respectively, in New York City.

And then, there come to mind the splendid old mansions in the neighborhood of Benefit Street, in Providence, Rhode Island, and along Federal Street, in Salem, Massachusettses, all in brown color schemes, mostly monotonous, depending upon richness of detail for contrast and shadow. I may tell you, however, why the new Meeting-house at Summit was placed, apparently, with its back to the street. It was done for a certain and irresistible dramatic note in the setting that nothing else would produce. The theory of Orientation played no part.

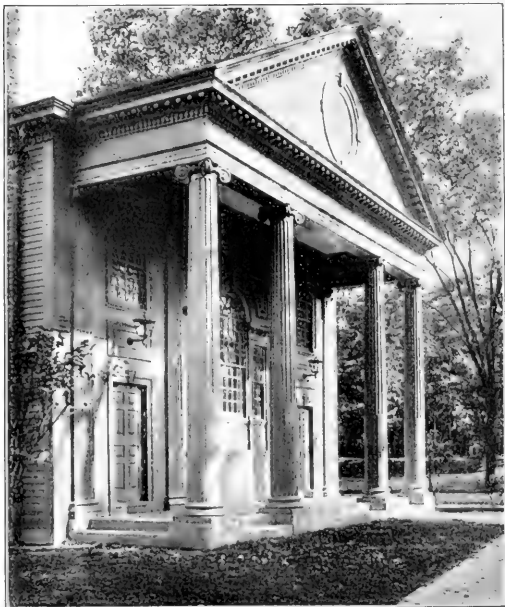
One is little prepared for the religious perspective which greets one upon entering the Meeting-house from Waldron Avenue—the main entrance. People remark the high pulpit with its sounding-board, the lectern, the chancel, the altar over which it is easy for the imagination to descry a sanctuary lamp dimly burning. There is even a faint suspicion of incense in the atmosphere, which however, is nothing but a certain historic haze the architect of the building has artfully produced, rather than services in which acolytes have taken part. Conventional manners and reticence are likely to give way to the heart-to-heart question—

"And pray, what kind of a church is this, anyway?"

"It is the Unitarian Meeting-house."

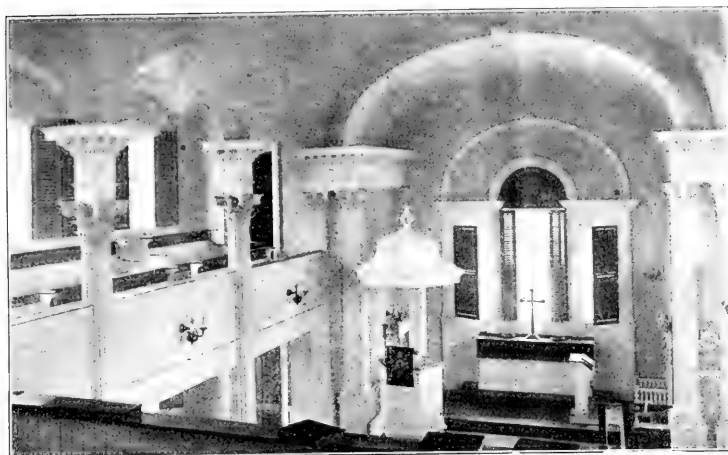
"What are you saying?"—and tableau of consternation!

Yes, it is difficult—very difficult for an architect to design a Unitarian Meeting-house. The requirements are so exacting. Strange as it may seem, it is the very symbols of some of the densest of religious superstition.



THE NEW MEETING HOUSE

The old time hallowed atmosphere of the great portico.



THE INTERIOR FROM THE ORGAN LOFT

The feeling in this picture is hard to describe, but "homilies were in the air"—the quiet and peace of a blessed place.

that go toward making this Meeting-house so awfully fetching. They all help to make us kin with Christian worshippers of past centuries; and that is something the human mind must have—companionship. In a Unitarian



THE LECTERN

The simple dignity of the high pulpit with its sounding-board, the Renaissance lectern and the approach to the chancel.



THE HIGH PULPIT

The sheer beauty and purity of the decorative treatment of the interior of the new Meeting House is plainly felt in these two pictures.

meeting-house the wooden roof-tree is the best kind of an introduction to anyone you meet beneath it. You may claim anyone's acquaintance.

If you have committed some utterly unnecessary sin of the heart, you had better not come to church at all until the foul crime, whatever it be, is made good, or is "burnt and purged away," until, indeed, you may return to the old, square pew of your pious forefathers, with their wonted sense of receiving a kind of Marconigram from heaven, which deciphered reads—"Well done, good and faithful servant, enter thou into the joy of thy Lord." For a Unitarian meeting-house has neither nook nor cranny where an evil deed may bestow itself and say that it is safe. There are no expiatory waste-baskets. The dyed-in-the-wool Unitarian is always the son in the field, never the

returning prodigal—the son who says to his father—“Lo, these many years do I serve thee, neither transgressed I at any time thy commandment; and yet thou never gavest me a kid that I might merry with my friends” and goes to church rather for the comforting reassurance, in lieu of a surprise party and fatted calf—“Son, thou art ever with me, and all that I have is thine.”

Hence, the architect of a successful Unitarian meeting-house must, by subtle architectonic expression, set forth the scenario of the faith—that, in spite of the terrible handicap that has been placed upon poor human nature, even though God either cannot or will not be merciful to all men from the human standpoint, we can be, and intend to be, though indeed it demands, as Robert Louis Stevenson says on the illuminated cards—“all that a man has of fortitude and delicacy.”

The architect must make the world appear less tragic than it is, by a meeting-house at once distinctive and graceful, one whereby we may forget for the moment that there are some very disagreeable things in this beautiful world to conceal. He must have the atmosphere produced by agnes of Unitarian sacrifice and devotion. He wants to inclose some holy ground that those who habitually wear muddy shoes, may be seeking the

old-fashioned scraper at the threshold. He wants the feeling of great age and veneration in his building, for the confidence in our good deeds it inspires. He wants

the tranquility of twilight for the flood of memories and historic associations that come with it. He wants to make believe that the meeting-house is a restoration rather than a new building, and that it has already stood upon its site for a century or two, that the old square pews have remained the property of the different families for generations, still with enough and plenty to go 'round (even if there really isn't) universal respectability and bienséance. He wants to make believe that there is no grim want to dishearten us, are no skeletons to be ashamed of, no black sheep to dread, no don't-miss-anything relatives to scandalize, no militarists to organize, harness and drive the weak-minded, no pacifists, and that when Sunday mornnig comes again, we are free to repair to the same old pew where our father, grand-

father and great-grandfather knelt, before us, glad to join in the responses and litanies as of yore—

“O God, who by Thy Son hast redeemed the world—”

And these are the spiritual needs we have endeavored to meet by the art of the new meeting-house.



THE ENTRANCE

This photograph reproduces faithfully the detail of the entrance—beautiful in its simplicity, homelike and inviting.

SECRETARY HOUSTON URGES PROTECTION OF THE FORESTS

GREATER conservation of wood and wood products through protection of the raw material in the forests of the United States, is urged by Secretary Houston, of the Department of Agriculture. The secretary's annual report also advocates provisions for pushing more rapidly the improvement work in the forests, for a greater number of forest guards, and for earlier organization each fire season of the protective system.

It is declared that protection of the forests during the present year proved an exceptionally difficult task. An annual strain was imposed on an organization somewhat depleted in numbers and much weakened by the loss of many of its most experienced men. Added to this was the difficulty of securing good men for temporary ap-

pointment as guards during the fire season, and parties of men for fighting large fires. An unusually early and severe dry season caused the outbreak of serious fires before the summer protective organizations were fully ready.

The Department declares that some embarrassment in meeting the situation was caused by the failure of the annual appropriation act to pass Congress until after the fire season was virtually over. Relief was furnished by the President, who placed \$1,000,000 at the Secretary's disposal as a loan from the President's emergency fund. It may be necessary, the Secretary says, to seek from Congress again a deficiency appropriation of \$750,000.

ALPHABET GROWN ON TREES

BY H. E. ZIMMERMAN

IN the course of a number of years Mr. E. A. Miles, of Clifton Springs, New York, has collected one of the most unique alphabets in existence. In addition to the letters of the alphabet a complete set of numerals was also collected. The numerals and letters were all cut from trees, the numerals only having been found in the vicinity of Clifton Springs. There is but one root in the collection. In no instance have the letters or numerals been twisted into their present shape. They grew that way naturally. The letters are from the following places: A from Oshawa, Canada; B from Banff, Canada; C from near the summit of Mt. Tamalpais, California; D from Erie County, New York; E from Marilla, New York; F from Great Falls of the Potomac, near Washington, D. C.; G near Attica, New York; H near Clifton Springs,



NATURAL LETTERS AND NUMERALS

Formations from trees and shrubs growing on battlefields and places of historic interest in the United States and Canada, making a complete alphabet and numerals.

New York (this letter is the only one formed from a root); I from grounds near the former home of William A. Wheeler, Malone, New York, former Vice-President of the United States; J from Grand Canyon of the Colorado, Arizona; K near Attica, New York; L from Lunday's Lane battlefield, Ontario, Canada; M near Attica, New York, while walking with his mother, a striking coincidence indeed, when it is remembered that the word "mother" begins with an "M"; N, which was the first one discovered, was found near Clifton Springs, New York; O and P were also found there; Q came from near the top of Mt. Lowe, California; R from near the Parliament buildings, Toronto, Canada; S near Clifton Springs, New York. On a visit to the tomb of Lincoln, Springfield, Illinois, Mr. Miles saw a gentleman trimming a tree near Lincoln's tomb. In one of the small branches cut away Mr. Miles saw a well-formed letter T. He got it for the mere asking. U is from Clifton Springs, New York; V from Plains of Abraham, Quebec, Canada, where Wolf died; W near Attica, New York; X on Little Roundtop, Gettysburg, Pennsylvania; Y in the vicinity of Petersburg, Virginia, where the well-known tunnel was exploded in the Civil War, and Z near Attica, New York.

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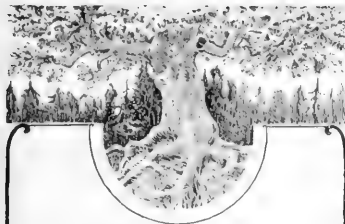
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FRAME HOUSES FOR FRANCE AND BELGIUM.

NOW is the time to promote sentiment for the frame house in France and Belgium, according to R. S. Whiting, Architectural Engineer of the National Lumber Manufacturers' Association. He points out that the people of these countries for hundreds of years have lived in houses built of stone, and know nothing of the utility and beauty of the frame home as it is known in America.

Mr. Whiting declares he is doubtful as to whether the French and Belgians will go back to the stone houses and he sees a chance for American lumbermen to inaugurate such a wood building propaganda that the people over there will learn to want the frame house.

Mr. Whiting suggests that architects in the United States who are favorable to wood construction should be immediately put to work on the task of studying French and Belgian conditions, in order to devise the best frame home for them along lines that meet their own ideas of what a home should be.

LUMBERMEN WILL AID IN RECONSTRUCTION.

THE lumbermen of the United States have pledged themselves to co-operate with all other industries and with the agencies of the Government in the reconstruction work which confronts the nation as the result of the World War. This was the decision reached at the conference held at Chicago under the auspices of the National Lumber Manufacturers Association. The sessions were participated in by representative lumber manufacturers from all sections of the United States and by organizations of lumber wholesalers and retailers.

An intimate discussion of the problems which are yet to be solved, before the country returns to normal working conditions, was the main feature of the conference. All phases of the situation were gone into and the net result was a definite program which is expected to be carried out.

President John H. Kirby of the National Lumber Manufacturers' Association declared that the conference will have far reaching effects upon the industry. The absolute harmony of purpose which prevailed and the definite plans which were adopted, he declared, were a guaranty that the industry would be found working alongside of all others in the reconstruction program for the nation.

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE forest protective associations in the Province of Quebec are keeping up their record for progress and The St. Maurice Association has decided to buy two flying boats and their equipment for use during the coming season. A committee has been appointed and tenders have been asked for. Stations for housing the machines will be built together with a centrally located machine shop for the repair of the Association's mechanical equipment, which now consists of railway gasoline speeders, automobiles, motorcycles and motor driven pumps. The motorcycles have proved a very marked success during the past season. The usual type was employed except that they were geared down and an especially heavy front fork was used. These machines can go over the roughest roads, they can carry in the side-car a motor driven pump with 600 feet of hose and are much more economical to operate than automobiles.

The St. Maurice Association has completed its season's work, having extinguished seventy-four fires which burnt over an area of 3,443 acres, or .041 of 1 per cent of the area patrolled. The total cost was 7-20 of a cent per acre and the total cost of extinguishing fires which required extra labor besides that of a ranger was \$936. Although wages and equipment cost more than in previous years the assessment per acre was not raised.

Mr. D. C. A. Galarneau, late forester for Algoma Central Railroad, has accepted a position with the St. Maurice Paper Company of Three Rivers. Professional foresters are proving their worth to the big paper and pulp companies.

On December 10th a forestry conference was held by the Canadian Forestry Association and the Members of the Government of Nova Scotia. It is hoped that as a result of this meeting a Forest Service along the lines of that lately established in New Brunswick will result. Such a service is badly needed and will be a great asset for the Province and will bring it into line with development in the rest of the Dominion.

Among the cause of fires in one of our Provinces we find "Campers and Tourists" and the list of fires attributed to them is quite large. Unfortunately a large number of these are Americans, and the writer takes this opportunity of calling the attention of all our friends who visit this side of the line in the summer to visit the

beautiful north country to the damage they do thoughtlessly. It is realized that we have only to direct attention to this matter to ensure its absolute elimination. The greatest offence is in failing to extinguish camp fires.

Next year the Canadian Forestry Journal will appear in a new dress and in enlarged and improved form. The Canadian Forestry Association is rapidly growing in membership and influence and its field of usefulness is constantly broadening.

Owing to the closing of munition factories the amount of labor available for woods operations has been somewhat increased and the outlook for normal production somewhat bettered. However the cut of both lumber and pulpwood is likely to be less than usual.

The plans for the opening of a new Forest Products Laboratory in British Columbia are progressing favorably and it will soon be under way. The Dominion Government will co-operate with the University of British Columbia in its installation.

The Canadian Government has started a five months course in Forestry at the University of British Columbia for returned soldiers, to fit them for rangers and for Government work. Mr. E. J. Hanzlik will be in charge of the work. The course opened November 1st and will continue until March 31st. This is a most excellent idea as the crying need has been in Canada for competent men to fill ranger positions. It is to be hoped that something of the kind can be undertaken in the East.

The work done by the new Fire Protection Service in Ontario during the past season has been excellent and shows great improvement over previous conditions. The organization is now complete and in fine running order. The equipment is complete and the system of supervision and reports excellent. There is still great danger from the new settlers in the "clay belt" owing to the rapid clearing of large areas of land. The permit system is working well, but so many fires for clearing are necessary that their rigid control is very difficult. The time has come when fire protective agencies, Government or co-operative, must take some steps toward themselves burning debris for settlers and loggers, simply as a preventive measure. If slash burning could be undertaken by such agencies instead of being left to the settler and the lumberman a

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great saving in the cost of extinguishing fires would be accomplished; and, as the cost of this work would be charged to protection instead of to logging operations, the objection of the Woodlands Departments to cleaning up the woods would disappear. It is fairly certain that if all logging slash was burnt after the operations were finished and before the danger season arrived, forest fires would almost disappear. Fires in virgin stands are comparatively rare under present protective measures. The great majority occur in cut-over land and on old burns, and these fires are extremely difficult to fight and spread rapidly over large areas. Some work along these lines will probably be undertaken next season as an experiment.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors, and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.*

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WOOD FOR THOUSANDS OF USES.

TWO of the outstanding results of the recent Lumber Congress in Chicago are the renewal of peace time activity in the lumber industry, and the apparent determination of manufacturers of this product that wood as a construction material shall become known in all quarters of the earth.

Not that wood is not now known—for it is. But it is proposed that it shall become known in a new way. Its utility for countless building purposes and in the manufacture of countless articles of use—that is the goal for which those who turn

the products of the forest to account for mankind are striving.

Plans are being materialized in lumber organizations the object of which is the dissemination of information about wood. It is proposed that no possible question on the point of wood utility shall be left unanswered. And all of this information is to go to the remote corners of the earth, not only in the United States, but on other continents.

In this connection, it is announced, the National Lumber Manufacturers Association has had compiled by experts pamphlets containing valuable data about all branches of the lumber industry.

BOOK REVIEWS

France, the France I Love, by Dr. Du Bois Loux. Pauline L. Diver, New York City. Price, \$1.50. This is the first of the series—*My Tribute to France*—to be published by Miss Diver, and the little book greets the world most attractively bound in broad bands of red, white and blue—simulating the tri-color of France, that flag which is the triumphant emblem of a proud and simple people. In his introduction called "The Significance of France," Dr. Frank Crane says:

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"Superficial observers before this war thought that she was going down the purple path of dalliance to disintegration. They little know the depths of her resources. She has rallied magnificently.

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IMPROVEMENT OF FORESTS

Providence Journal

The question of more and better highways in the Adirondack region is of particular interest to the motor fraternity. Touring autoists are especially interested in having the existing roads improved and new ones developed, suggests Eugene M. Travis, New York State Comptroller. The welfare of these travellers is intimately bound up with the increased accessibility for tourists, campers and settlers of the entire Adirondacks. The work of protecting the forests against fire is greatly facilitated by improved roads, enabling the prompt mobilization of men to fight fire.

OREGON TREES DISEASED

Portland Oregonian

Fire trees along the Columbia River Highway, which are turning brown, as though seared by fire, according to foresters of the United States Forest Service, are not dying, but are merely suffering from a Spring disease something like the grippe, which every spring or two attacks Douglas fir growing where it is subject to the dry, cold east winds, which sweep down the Columbia River Gorge. This rather unique local disease of the Douglas fir was recently named "parch blight" by Thornton T. Munger of the Portland forestry office.

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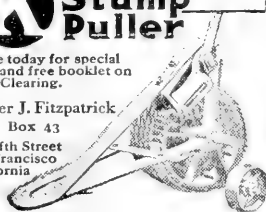


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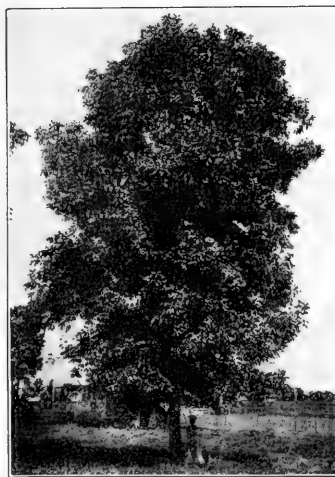
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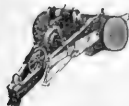
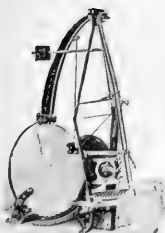
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Declaration of Principles and Policy of The American Forestry Association

- IT IS A VOLUNTARY** organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.
- IT IS INDEPENDENT**, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.
- IT ASSERTS THAT** forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.
- IT DECLARES THAT FORESTRY** is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.
- IT RECOGNIZES THAT** forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.
- IT WILL DEVOTE** its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural, regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

VICTORY GARDENS MUST HELP FEED THE WORLD



THE WORK OF THE NATIONAL WAR GARDEN COMMISSION WILL BE CONTINUED DURING 1919 WITH INCREASED VIGOR. THE FOOD PROBLEMS BROUGHT ABOUT BY THE SIGNING OF THE ARMISTICE ARE MUCH GREATER THAN THOSE EXISTING DURING THE WAR. MANY MILLIONS HAVE BEEN ADDED TO THE NUMBER OF PEOPLE IN EUROPE WHO MUST BE FED BY AMERICA. TO FEED THEM DEMANDS ADDED EFFORT TOWARD FOOD PRODUCTION.



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BY REASON OF CLOSE AFFILIATION, THROUGH ITS CONSERVATION DEPARTMENT, THE AMERICAN FORESTRY ASSOCIATION HAS DIRECT INTEREST IN THE SUCCESSFUL WORK NOW BEING CONDUCTED ON AN INTERNATIONAL SCALE BY THE NATIONAL WAR GARDEN COMMISSION. MEMBERS ARE URGED TO SEE THAT THEIR FRIENDS ARE SUPPLIED WITH SUCH OF THE COMMISSION'S FREE PUBLICATIONS AS CAN BE PUT TO GOOD USE.

Copies will be Sent upon Request

The National War Garden Commission
Washington, D.C.

Charles Lathrop Pack, President.

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NUMBER 302

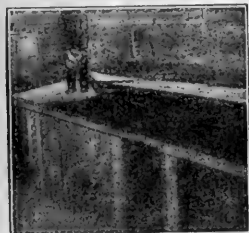
American Forestry



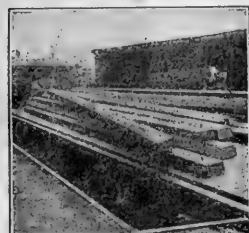
An Illustrated Magazine about Forestry and Kindred Subjects Published Each
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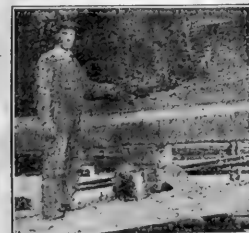
Commercial Plant for Creosoting Poles by the Open-Tank System. Western Wood Preservers, Sandpoint, Idaho. (W. C. Assoc.)



Spraying roof deck of box car with Carbosota Creosote Oil (no paint used).



Creosoting car sills by open tank process.



Brush-treating faying surfaces of ship timbers with Carbosota.



Faying surfaces of timbers brush-treated with Carbosota. (Courtesy Peninsula Ship Bldg. Co.)



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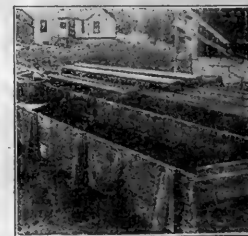
The Open-Tank Process: Simple wooden tank (lined with sheet iron) equipped with steam coils and small derrick.



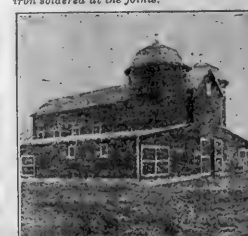
Spraying: Applying Carbosota to ends, mortises, and tenons (points of contact) of caps and stringers for trestle.



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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

FEBRUARY 1919 VOL. 25

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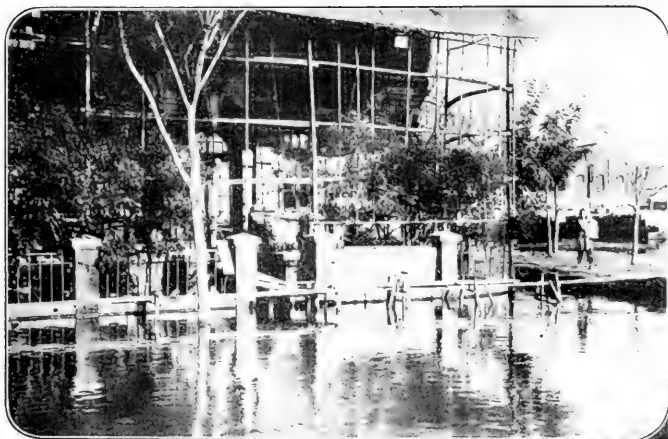
No. 302



IN THE PIKE NATIONAL FOREST, COLORADO

Seven Falls, South Cheyenne Canon. Three hundred feet high, the ascent is made by 267 wooden and 20 stone steps

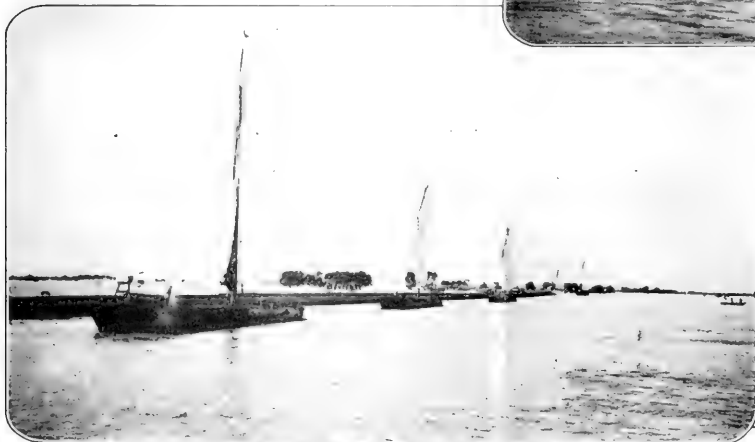
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Sad experiences in previous generations taught the people the danger of building their mud-walled houses on the level plains. Consequently in this vicinity the villages generally are perched on the high spots of land, and they were only partially submerged. After many weeks the waters slowly subsided, and here and there in the distance a few trees could be seen, or a forlorn village

North China Flood Pictures

IN Chili Province, south of Tientsin, the dikes on either side of the Grand Canal gave way. Hundreds of square miles of land were submerged. We left Tientsin and traveled by steam launch over flooded fields a distance of thirty miles before reaching the broken end of the



standing partially above the waste of waters.

Greater Tientsin is divided into a number of foreign settlements or concessions—Japanese, British, German and Russian—all outside of and separate from the real Chinese city of Tientsin. Large portions of these concessions were flooded, with water over the first floor of the houses.

—Photographs by courtesy of Mr. Frederick R. Sites.

Tientsin-Pukow Railway. Parts of the dikes remained standing slightly above the water level, and at these places the boatman utilized both man-power in towing, and wind power on their sails to move the heavily laden cargo boats. Disease and epidemics threatened. A mad rush was made to get rid of the flood waters. Temporary dikes were rapidly built along the boundaries of the various concessions. The woman carrying the baby is walking on one of these dikes.



FORESTS AND FLOODS IN CHINA

BY HERMAN H. CHAPMAN

PERHAPS no phase of forestry has aroused so wide a public interest as the influence of forests upon stream flow. For over a century, the governments of modern nations, notably France, have proceeded on the basis that the denudation of mountain slopes caused ruin by unleashing the demons of flood and erosion, and that the only effectual means of control were reforestation of these slopes, combined with artificial barriers in the beds of the torrents. And the only possible method of bringing these great projects of restoration and protection to a successful conclusion has been found to be national control.

While France, under the constructive national forces of the republic, has gone a long way towards correcting the evil of denudation which followed the rampant individualism of the revolutionary era, America has been

struggling towards a realization of the same truths. For over a century, not counting the colonial era, our nation took no effective steps to safeguard the public interests represented by the protection belts of forested mountains from which our rivers take their rise. Finally, the principle of national ownership and control was won, both in the west and the east, and we are buying back the lands in the Appalachians and White Mountains which passed from public control under a thoughtless and exaggerated individualism.

Meanwhile, China has been the principal sufferer from floods due to deforestation, and the best and most convincing examples of the devastation and ruin caused thereby may be studied in the great plains of north central China, whose rivers rise in steep mountainous country, which has been converted by unchecked forest



Courtesy of "Asia"

THE GREAT WALL OF CHINA

Looking out over the barren hills, one subtly feels that "immemorial mystery of North China, wrapping Peking like an imperial purple mantle, a somber northern inscrutability enfolding the Great Wall as impenetrably as the mists obscuring its turrets."

exploitation into barren slopes devoid of vegetation.

It remains for an educated and keen minded Chinese forester, Dai Yang Lin, a graduate of the Yale Forest School at New Haven, Connecticut, and a pioneer in the awakening of new China, to present these facts to the world in a manner thoroughly convincing.

Mr. Lin is connected with the University of Nanking, and has devoted his entire time for three years to studying the effects of floods and the influence of forests on their control. In



A RIVER BED IN SOUTH MANCHURIA

Broad and stony, with almost no water, this shows clearly the evil results of deforestation. The region is also notorious for the many robbers which infest it.

Photograph by Frank N. Meyer

a pamphlet prepared by him and issued by the Chinese Forestry Association, entitled, "Forests and the Chihli Floods," he sums up the evidence. Mr. Lin does not rely on his own judgment, but quotes from the published statements of many prominent engineers, none of them foresters (until within a few years there have been no foresters in China), in support of his conclusions. These are:

1. That the river channels in the Chinese plains are incapable of carrying



ARTIFICIAL TERRACING

A striking picture taken in Shansi Province, China, showing other deforested mountains with artificial terracing to prevent further erosion.

to the sea the enormous discharge of water in times of flood.

2. That this condition is tremendously aggravated by the great quantities of silt carried down by the torrents, which the streams are forced to deposit as soon as their velocity is checked by the low gradient of the plains.

3. That it is impossible ever to improve these channels by deepening or by levees so that they will carry these floods and silt.

4. That the volume of water and silt must be diminished at its sources in the mountains, so that not only will the flow be extended in point of time and diminished in velocity, but that by so doing the carrying power of the stream will be proportionately lessened and the load of silt diminished.

5. That there are but two means of securing this result—the erection of barriers, dams and reservoirs, and the reforestation of the denuded slopes.

6. That the construction of dams and reservoirs is not only enormously expensive, but will *not solve* the problem, since these reservoirs will rapidly and completely fill up with silt, requiring their renewal perpetually.

7. That the reforestation of the slopes offers the only hope, and the most practicable method for checking this erosion of soil, and that without reforestation the plains of China will continually be subject to floods of greater and greater severity.

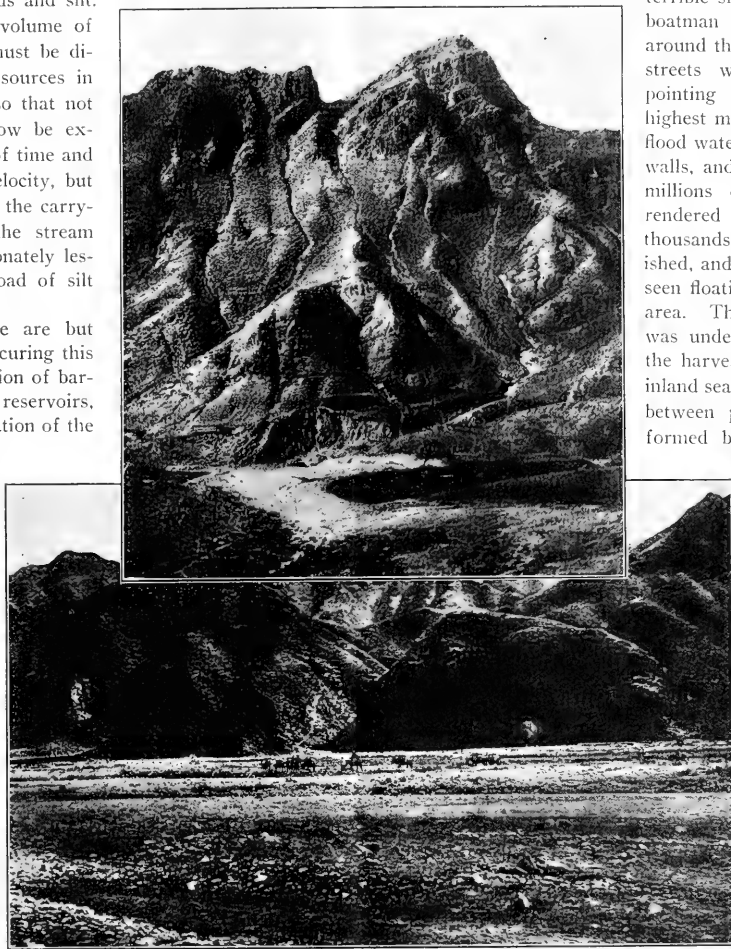
Few of us have any conception of the problem which the Chinese have brought upon themselves by their shortsighted destruction of these mountain forests—a result due directly to the complete absence of government ownership and control of these lands and by the exercise

of the rights of private individuals to do as they pleased regardless of the welfare of the nation or posterity.

The brief account given by Lin of the great Chihli flood of 1917 may visualize the tragedy resulting from this selfish shortsightedness.

"While in Tientsin during the months of November and December of 1917, I had the opportunity of going through the flooded sections of this city, and it was a terrible sight indeed! The boatman who took us around through the flooded streets would indulge in pointing out to us the highest marks made by the flood water on the different walls, and also tell us that millions of natives were rendered homeless, that thousands had already perished, and that coffins were seen floating in the flooded area. The country which was under crop ready for the harvest is now a great inland sea with boats plying between points or islands formed by rising ground.

The damage that has been done to crops and houses, the loss caused by stoppage of trade, interruption of railway traffic on the Peking - Hankow and the Tientsin - Pukow railways—this has been estimated at hundreds of millions of dollars. It is further estimated that in the city of Tientsin alone there are more than 120,000 flood



TYPICAL SCENES IN CHINA

Taken in Wu Tai Shan, Shansi, the upper picture shows starkly naked mountains, completely deforested, while the lower picture shows the consequent erosion at the foot of the hills and a caravan crossing through the dry river beds.

sufferers, but thank goodness, most of these sufferers are being properly taken care of by different organizations and for their shelter thousands of mud huts have been put up.

"According to the latest report of the general Relief Committee, which gives detailed information of each of the hsien that has suffered from the floods, we learn that there are altogether 103 hsien or 17,646 villages affected



Photograph by Frank N. Meyer

ABOVE THE CITY OF CHIEH CHOU

View of the deforested mountains and the big dike the people have built to prevent a small mountain stream, which carried down much mud and stony debris from over-running their city.

by the floods, and that in these hsien there are as many as 5,611,759 sufferers who are either homeless or starving.

"When we come to think of prosperous and peaceful Switzerland as having a population of only 3,425,000 and an area of 15,975 square miles as compared with 5,611,749 sufferers and 15,000 square miles of flooded districts here, we at once comprehend the severity and the extent of devastation by the floods; and it is no wonder that they have been called phenomenal floods or something that Chihli province has not experienced for the last 170 years.

"Dr. P. E. Licent, a well-known scientist, who conducted perhaps a more scientific investigation through the flooded districts than anybody else, said: 'It is to be

feared that next fall there will be another big flood around Tientsin, because the five rivers in this province are badly silted up and the embankments are in bad repair. For instance, along the Tze-ya Ho from Sien-hsien to Tientsin, I saw twelve places at which the embankments are broken. Now it is on account of a long continued deforestation which has deprived the different watersheds of their protective covering that all these rivers have become silted up.' Then pointing to the map, he continued: 'I was traveling in the mountains near Paotingfu last August, and I saw hundreds of corpses washed down with houses, dead cattle, bowlders, etc., by the terrific torrents. In one place called Tai Lun Mung near Chochow, I saw eighty-four corpses floating gruesomely on a little pond. The terrible mountain torrents must have been responsible for such a state of affairs. China cannot hope to harness her water or regulate her streams until these torrents are stopped and to stop them permanently a systematic program of reforestation must be carried out.'"

The conditions caused by these floods tend to become steadily worse, as indicated by Dr. Licent. The river



Photograph by Frank N. Meyer

THE JIJI SHUI KIANG OR BLACK-WATER RIVER

It passes the city of Chieh Chou and runs along mountains which have been totally deforested. As a result many landslides take place in the rainy season and the city is always in danger of being destroyed by the river.

beds become completely filled with great masses of sand and silt, and the mountain slopes become furrowed into deep gullies through which the torrents roar in foaming, boulder strewn crests after every downpour. Mr. Lin cites the well known physical law that the carrying power of water increases as the sixth power of its velocity, so that an increase to ten times the rate of flow multiplies the power of the stream to transport mud and rocks by one million. This detritus in turn tears out and deepens the gullies, thus concentrating and increasing the velocity of the water. The vicious circle thus established has the most appalling results, and the devastation by a single flood of an area whose population and resources are equal to Switzerland, is the logical consequence.

Among the many citations quoted by Mr. Lin to show that reforestation alone offers a permanent solution of



Photograph by Frank N. Meyer

VIEW FROM THE LARGE DIKE

This looks over the city of Chieh Chou, Kansu, China, and shows how much lower the streets are than the brim of the dike. By digging a small canal and by reforestation, the situation would be enormously improved.

these evils which threaten to destroy whole provinces, is that of Mr. H. Vander Veen, C. E., consulting engineer to the Natural Conservancy Bureau, Pekin.

"As long as the slope of the water level is such that a current can be maintained strong enough to carry all the matter held in suspension along, no harm is done. But the natural slope of the plain is, for several rivers, insufficient. In such a case the river is therefore forced to get rid of the soil, held in suspension, along its way, consequently its bed gets raised and in the long run the river has to find another course, which it does by bursting its dikes to find in the lower lying land the place where it can deposit its burden, which it could carry no longer and for which no more room could be found in the old bed. This is the case more or less with every river running through the plain of China.

"The only way to diminish this evil is to diminish the amount of soil brought down from the mountains. And the reason for this enormous quantity of silt coming down from the mountains is that those mountains are bare so that during a heavy rain nothing prevents the water from rushing downward practically immediately after it has fallen, taking with it large quantities of soil,



Photograph by Frank N. Meyer

INSPIRING MOUNTAIN SCENERY NEAR SHAN HAI KWAI, CHINA

At the base of the mountain in the foreground of the picture a little growth of pine trees may be observed, otherwise all vegetation has been removed by the Chinese.

flow of the water, as has sometimes been suggested, is not only far too expensive but moreover wrong as it does not do away with the problem of silt. Sooner or later these reservoirs would become filled, consequently new ones would have to be built, a process which would have to be carried on into eternity.

"Reafforestation is most imperative, for without reafforestation the improvement of rivers can only be partly accomplished, but all these processes going hand in hand, the improvement of the hydraulic conditions of the country will be decisive."

China has been brought to this condition directly by the absence of a national consciousness and of organized methods of government by which the will of the people



Photograph by Frank N. Meyer

THE YELLOW RIVER "CHINA'S SORROW"

Several hundreds of feet of good cotton land have been eaten away during a few weeks. Not in vain is the river called "China's Sorrow" for life and property is never quite safe within its immediate neighborhood. Near Chao Yi, Shensi, China.

so that it reaches the river down below more like torrents of mud than of water. Now if those mountains were planted with trees not only would then the water be unable to take away so much soil but it would also reach the river gradually in a regular flow divided over a longer period and not within a few hours in fierce torrents.

"It is impossible, therefore, to lay too much stress upon the enormous importance of reafforestation. The deterioration of the various rivers in China and specially of those in this province, would never have reached its present stage if deforestation had not taken place. I say specially the rivers in this province because they all take their rise in the mountains west of the Peking-Hankow line, which for a great part consist of loess, a soil which is easily carried away by the rain.

"To build reservoirs in the hills in order to regulate the



Photograph by Frank N. Meyer

CARAVAN PASSING THROUGH A FORESTED REGION

This is at an elevation of about 9,500 feet above sea level. The muleteers have just set fire to a bit of dry brushwood, against express orders, and a nice forest of blue spruce and white birch is in full flame near Yang Sa, Kansu, China.



American Red Cross Official Photograph

THE GROUP OF ADMINISTRATION BUILDINGS

To the right are seen the rounded backs of the rows of huts built for the refugees at a total cost of about ten dollars per hut.

could be enforced to secure public welfare and restrain the greed of individuals, which will always, in the absence of such control, throw responsibility for economic consequences to the wind and grab for the immediate profit.

In the United States the struggle for public welfare and the restraint of ruthless individualism has been waged with more success. Just in time, our great mountainous public lands of the West were established as permanent national forests—and with the adoption of the policy of purchasing lands in the Appalachians and White Mountains, the economic error of permitting these slopes with their protective forest cov-

er, to pass through the process of denudation which has been completed in China, bids fair to be checked in time.

It has never been claimed by foresters or engineers that results of equal destructiveness to those now occurring in China would follow the denudation of forested slopes in this country. But this is true *only* because the combination of conditions here is less dangerous. In the Chinese plain, the watersheds of those rivers comprise 60,000 square miles of very steep slopes, combined with a soil of loess or wind-placed silt—and these conditions are aggravated by the flat gradient of the rivers in the plains below, and by their extremely



Photograph by Frank N. Meyer

NATIVE WOMEN CARRYING BUNDLES OF FIRE WOOD

They start out very early in the morning to cut in the higher mountains and late in the afternoon they are back home again. In this way all chances of forests ever establishing themselves again are frustrated and lumber becomes more and more scarce in western China. Near Siku, Kansu, China.



American Red Cross Official Photograph

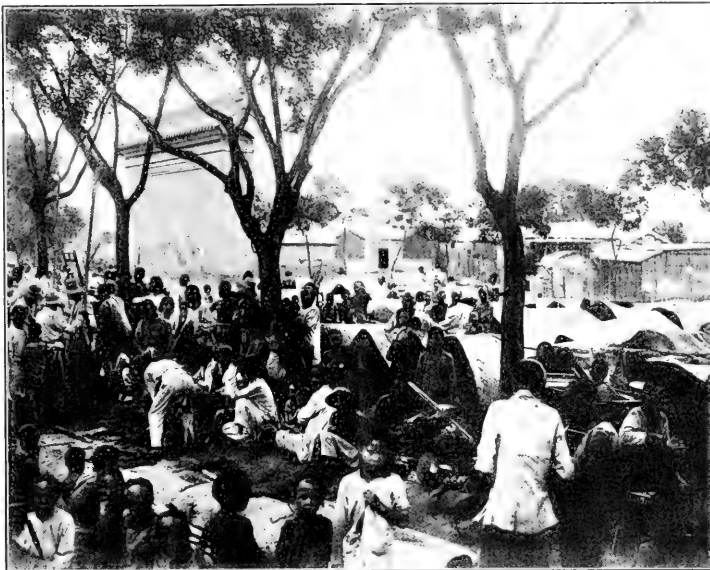
A GROUP OF FLOOD VICTIMS IN CAMP

At the "American camp" where accommodations were provided for a thousand families. The south exposure of the huts makes it easy to keep them warm.

dense population and great fertility. But the operation of physical laws of gravity and erosion are not confined to China. *To a lesser degree*, but to the full extent permitted by the topography, soil and rainfall, and by the stream gradients, these same results not only *will occur*, but *have already occurred* along the streams on the Atlantic seaboard and elsewhere. The reckless clearing of steep slopes in the Appalachians and in the wooded areas of Tennessee has caused extensive erosion,

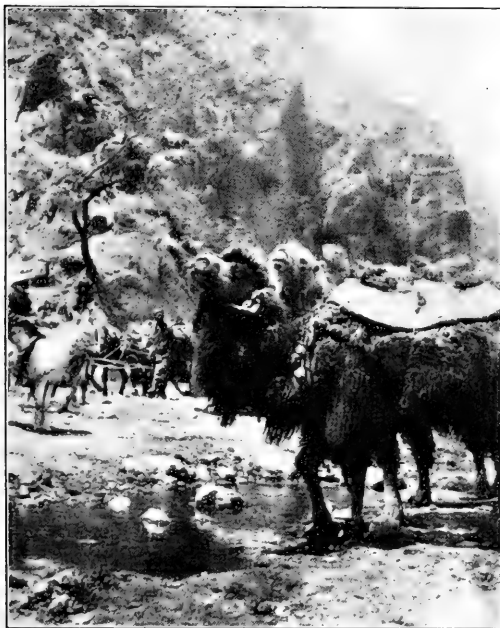
injured many rivers by silting, and destroyed millions in property values, while in the west, overgrazing of mountain slopes has been followed by rapid deterioration of valleys through unregulated movements of water.

Why is a forest cover the only solution of this problem? Because the damage is evidently caused by the combination of velocity, a function of volume of flow, and silt, which is the direct result of velocity and volume, and both these conditions are due to the



American Red Cross Official Photograph HOUSING FLOOD REFUGEES

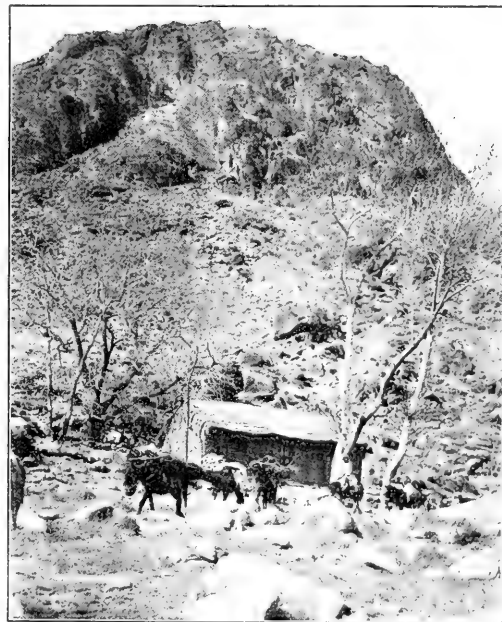
China and America joined hands through the Red Cross to provide and care for the refugees. This shows the huddle of mat huts in which refugees were living after the Tientsin flood before the American Red Cross camp was constructed.



Courtesy of "Asia"

THE CAMEL—TIRELESS SERVANT OF THE MONGOLIAN

Symbolizing to the European all the mysticism and romance of the desert—to the user of camels in China they are merely "indispensable utensils."



Photograph by Frank N. Meyer

ON THE ROAD FROM PEKING TO WU TAI SHAN

A halting place along the road where one can obtain a cup of tea and some coarse oatmeal cakes. A very sterile region and yet scenically very interesting.

character of the surface receiving the rainfall. Dams are inadequate because by the time the water reaches the streams it is too late to control either its velocity or its burden of silt except at enormous expense. But the forest cover controls both factors automatically. From the time the downpouring rain strikes the first or topmost portion of the tree canopy, until the clear water trickles or oozes into the streambeds below, the forest interposes a complete succession of natural barriers to floods and silt. The force of the rain on bare soil dislodges it and hardens the surface. The drainage from such a surface is rapid and complete, carrying sediment from the very point of impact, and causing the gullying to begin in every direction. Rain falling through a forest canopy drips gently to earth, upon a carpet of waterholding

litter and humus below which the soil is kept porous by protection from rain, by root penetration, and by the humus itself. The surface litter forms tiny dams in every depression and retards the formation and flow of surface water, replacing it with seepage. Not only is the

erosion of soil from the surface prevented, but the water is strained and kept clear. When abnormal rain falls swells the streams, their erosive force is kept low by the absence of silt at their sources.

Mr. Lin has contributed information of inestimable significance not only in China but throughout the civilized world, regarding the abso-

lute necessity of maintaining forests on mountain slopes as the one adequate means of protecting fertile plains and rivers, and preventing destructive floods. But not until China has fought and won the battle for national



A STRIKING EXAMPLE OF ARTIFICIAL TERRACING

From this point one may gaze far over this unknown land where hill after hill shows artificial terraces, painfully and patiently built on deforested mountains to prevent further erosion.



WU TAI SHAN, SHANXI PROVINCE, CHINA

Bottom lands buried in waste from deforested mountains.

consciousness and a national government responsive to the needs of the people, can she hope to solve this tremendous internal problem. Just as the physical laws operating to destroy the plains of China as a consequence of forest denudation, are world wide in their application, so the principles of government of the people, by the people and for the people are the only certain methods for securing permanent prosperity and contentment, whether they apply to Caucasians, Mongolians or South Sea Islanders. The Chinese have the natural intelligence to distinguish between despotism on the one hand and rampant individualism on

the other, such as caused France to lose considerable portions of her mountain forests. But it takes more than knowledge to secure results. China's barren mountain slopes must be reclothed with forests in order that

equable stream-flow may be maintained and her people in a measure protected from the terror of flood. They will to fight the battle for true democratic government in which order and efficiency is made subservient to the common good—this is the need of China today—and the first fruits of such a victory will be the creation of a national policy for reforesting the mountain slopes of northern China.



Photograph by Frank N. Meyer

LARCH FOREST

The last bit of larch forest left upon a northern mountain slope near the Tchai Ling Sze temple in the Wu Sai Shan region, Shansi, China. White tailed deer and wolves live here in this secluded remnant of the once extensive forest which covered all the now so appallingly barren slopes.



DEFORESTED MOUNTAIN SLOPES

Feeble efforts at farming may be plainly seen in the foreground. Wu Tai Shan, Shansi Province.

THE NEW SPRING SAW

WITH the aid of a new saw that has lately been introduced, it is claimed that a strong boy or woman is able to cut more wood than two experienced lumbermen equipped with a standard crosscut saw. In support



International Film Service

A SAW ANY ONE CAN USE

With this mechanism a boy or growing girl can handle any piece of cordwood that may be brought in to cut up for firewood. It requires but little muscular strength to operate it, and is said to work so smoothly as to attract the attention of the Government experts.

of this claim is the record made during a contest conducted a short time ago.

Two men with a crosscut saw mastered an 11-inch



International Film Service

CONGRESSMAN RAKER OF CALIFORNIA OPERATING THE SPRING SAW

This enables one person to do as much work as two ordinarily accomplish with a standard crosscut blade

chestnut log in 92 strokes, while one man, with the new machine saw, accomplished the same work in 70 strokes.

The implement consists of two steel arms actuated by a powerful connecting spring. A bracket is attached at the fore end of each of the members, and to these the blades are clamped. To operate, the saw is merely drawn back and forth in the usual manner, all of the necessary pressure being exerted by the spring. The entire contrivance weighs only 12 pounds. It is especially suited for the farmer who does not wish to incur the expense of purchasing a power outfit for cutting fuel wood. In addition to cutting logs, it may be employed for felling trees of medium size.—(*Popular Mechanics*).

ITALIAN GOVERNMENT BUYS TIMBER

AN INTERESTING and highly significant development with respect to the export lumber market has taken place within a short time, says a dispatch from New Orleans. The purchase, by commissioners representing the Italian Government, of 3½ million feet of yellow pine timber (specified of "Southern pine merchantable grades") for delivery at Gulf ports to be moved, via ships supplied by purchaser, to Italy. This sizable order was placed with the Southern Pine Emergency Bureau, which now is distributing the business among the Southern pine mills east and west of the Mississippi. It will be inspected at the mills by Association inspectors and shipped to designated ports to await the cargo-steamers, which are to be furnished by the buyers.

The order is noteworthy and important not only because of its size, but because of its indication that post-war lumber-buying for European countries may be handled largely by government commissions—which in their turn will deal with organized central agencies in preference to making direct purchases from the individual mills. It is not officially settled that this method will be adopted, but in addition to the Italian transaction noted above, there have been intimations very recently that France and England will buy lumber in this country through the "high commissions" which have handled their war-time purchases. The very important question of ocean tonnage, which has bothered students of the export market more than a little, may be disposed of if the business is handled upon the lines indicated, sellers making delivery at American ports and buyers providing cargo space.

SUBSTITUTES FOR HICKORY IN THE MANUFACTURE OF HANDLES

SPECIFICATIONS for handles for intrenching tools were prepared during the war by the Forest Products Laboratory at Madison, Wisconsin, allowing seven substitute species in place of hickory and also certain minor defects, thereby making possible greatly increased production for this class of material and at the same time giving satisfactory handles.

THE USES OF WOOD

WOOD USED IN VEHICLE MANUFACTURE

BY HU MAXWELL

Editor's Note.—This is the tenth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

NEARLY every kind of tree that grows to usable size in this country fills a place in vehicle manufacture or repair, either in shop or factory, or on the farms or highways where wagons and sleds are made or mended. So wide is the range of vehicles, as to sizes, kinds, and the places which they are expected to fill, that nearly any billet of wood, large or small, may give service as a sled sole, singletree, pin, crossbar, standard, spreader, neck yoke, axle, or something else that is helpful in making or mending vehicles. Statistics compiled in factories show much but not all of the wood consumed by vehicle makers or repairers. Teamsters on highways, farmers in fields, workmen with teams everywhere, need wood at times to make repairs, and often they go to the nearest forest, if one is convenient, and cut the piece they need. The people who do this put to use, somewhere and at sometime, practically every kind of wood

that grows in America. It is a sort of unwritten law that the driver of a vehicle must be able to make repairs of certain kinds when he happens to be out of reach of a shop. It has always been so; for Homer, writing of the siege of Troy, refers to a similar custom then: "His sounding ax lops green limbs from a sycamore to spoke a chariot wheel." The drivers of sleds, carts, and wagons have been swinging their axes ever since that time in woods and forests to procure wagon material to meet emergencies.

However, a discussion of the vehicle industry must here be confined to a narrower range than that which goes back to Homer's time, or to the activities of the repair man who mends and patches by highways and waysides wherever accidents occur. Up-to-date manufacturing and present day statistics must hold chief place.

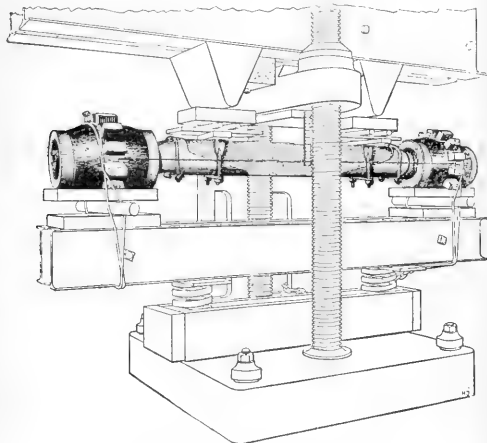
Investigators for the government have gone pretty



RAW MATERIAL FOR AXLES, HUBS AND FELLOES

This scene is in the hardwood region of Arkansas and is strictly up to date. The high grade oak is on its way to the mill for conversion into wagon stock to meet a portion of the extraordinary demand for tens of thousands of heavy wagons for our armies in foreign lands. Only the best wood is acceptable for this use.

fully into the industry which makes wagons, particularly as to the woods used in factories, though little attention has been given to the woods employed and the work done by individuals and in small shops which cannot be classed as factories. A summary of the investigations by the government shows that forty-two kinds of woods are worked into vehicles by factories in the United States, and that the total amount was approximately 740,000,000 feet a year in the period immediately preceding the war. The total is now probably much more. Forty-two woods are listed by name, but the actual number of species is much larger; because in most cases the listing is by genera, and different species are not mentioned by



HOW WAGON AXLES ARE TESTED

The above picture represents the type of machine employed by wagon manufacturers and by the Government in testing axles to determine their strength. Pressure by means of the powerful screws is applied until the axle is forced to give way; but the applied pressure is measured at the various stages and the information thus obtained is of future value.

name. For instance, all pines are classed as one, though there are thirty odd pines; all oaks as one, and there are more than fifty oaks; all hickories as one, though there are a dozen, all ash as if but one existed, but there are several, and so on down the list. Instead of only forty-two vehicle woods, as the list shows on its face, the number doubtless exceeds 150 if each species is duly credited with its share.

But accepting the figures as they are given, the vehicle makers use seven foreign woods, seven domestic softwoods, and twenty-eight domestic hardwoods. All the foreign species enumerated are hardwoods; so it turns out that of the forty-two woods, thirty-five are hardwoods. Measured in feet, the hardwoods total 702,264,693, the softwoods 36,878,444; expressed in percentages, the hardwoods constitute 95 per cent, the softwoods five per cent. The use of foreign woods in the vehicle industry are here shown:

	FEET		FEET
Mahogany.....	516,000	Padouk.....	1,000
Eucalyptus.....	40,000	Doncello.....	330
Circassian walnut.....	16,820	Spanish cedar.....	250
Rosewood.....	1,000		
Total.....	575,370		

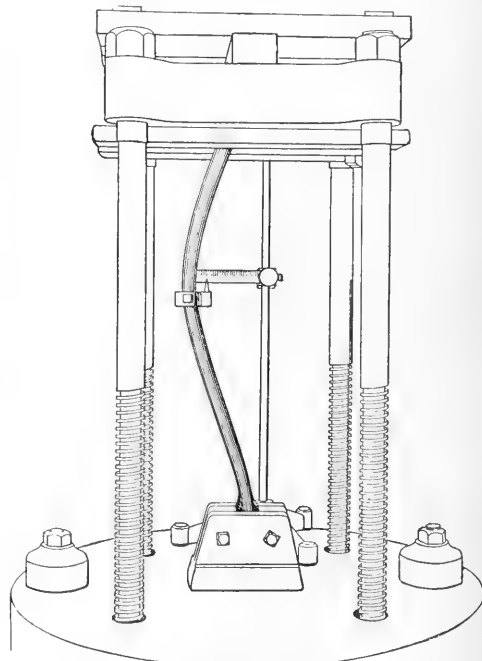
The names and amounts of the seven softwoods which contribute to the vehicle supply follow:

	FEET		FEET
Pine.....	33,077,955	Hemlock.....	448,678
Cypress.....	1,320,951	Redwood.....	259,000
Fir.....	934,610	Cedar.....	2,500
Spruce.....	835,650		
Total.....	36,878,444		

The list below names the hardwoods used annually in the American vehicle industry:

	FEET		FEET
Hickory.....	239,483,910	Hornbeam.....	126,000
Oak.....	212,918,361	Locust.....	110,350
Yellow poplar.....	48,665,960	Hackberry.....	100,000
Ash.....	43,974,668	Buckeye.....	63,419
Maple.....	35,863,267	Sycamore.....	62,600
Cottonwood.....	33,278,658	Cherry.....	39,650
Elm.....	31,296,922	Butternut.....	11,500
Red gum.....	26,650,314	Magnolia.....	9,500
Birch.....	14,267,125	Blue beech.....	5,000
Basswood.....	6,418,308	Cucumber.....	3,800
Beech.....	5,497,308	Applewood.....	1,000
Tupelo.....	1,067,600	Catalpa.....	500
Chestnut.....	972,809	China tree.....	500
Osage orange.....	439,026		
Black walnut.....	390,450	Total.....	701,687,940

Though numerous woods are used in a small way in vehicle making, comparatively few are employed in large amounts. The two most important are oak and hickory. All others combined do not equal the amounts of these two. They contribute sixty per cent of the whole supply. No other industry is so dependent upon one or two woods, except shuttles and lead pencils, in each of which



METHOD OF TESTING BUGGY SPOKES

The strain on a buggy spoke comes from endwise pressure, and if the spoke is overloaded it bulges at the middle. The machine represented in the above picture delivers and measures pressure of that kind, and the behavior of the spoke is shown. Tough woods bend, but brash woods break under that strain.

a single wood exceeds all others combined. For vehicles oak and hickory are fairly evenly matched in quantity, but hickory is the leader. Its place is in light vehicles like carriages, buggies, carts, and racing sulkies where elasticity or resiliency is highly essential. Oak goes more into heavy wagons where elasticity is not of first consideration but strength is accorded the leading place. The



WATER WAGON WITH WOODEN TANK

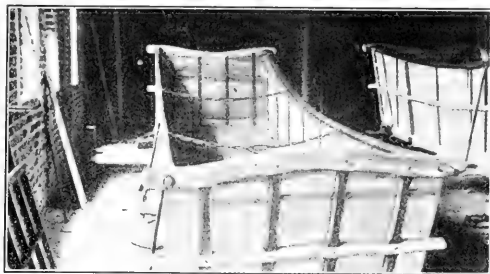
This vehicle, serviceable for the purpose intended, represents a rather unusual use for wood in wagon making. The work must be well put together or the joints will leak as the result of jolting over rough roads. The tank here shown was manufactured at York, Pennsylvania, by the A. B. Farquhar Company. The tank's capacity is ten barrels.

two woods, oak and hickory, are dissimilar in many of their qualities.

The average strength of hickory is about thirty-three per cent greater than that of oak, when both are well seasoned, but the strongest oaks are not below medium hickory in strength. Hickory is the tougher wood, and in point of elasticity, or the ability to spring back when bent, it averages about fifteen per cent superior to oak.

Every kind of wood varies greatly in strength and elasticity when one sample is compared with another, and hickory and oak are no exceptions. For that reason it is necessary to select these woods carefully for vehicles, to make sure

that each will be equal to the duty assigned it. Averages have been worked out by elaborate tests; and dimension stock is cut in sizes which will assure sufficient strength. Most large vehicle factories maintain testing apparatus



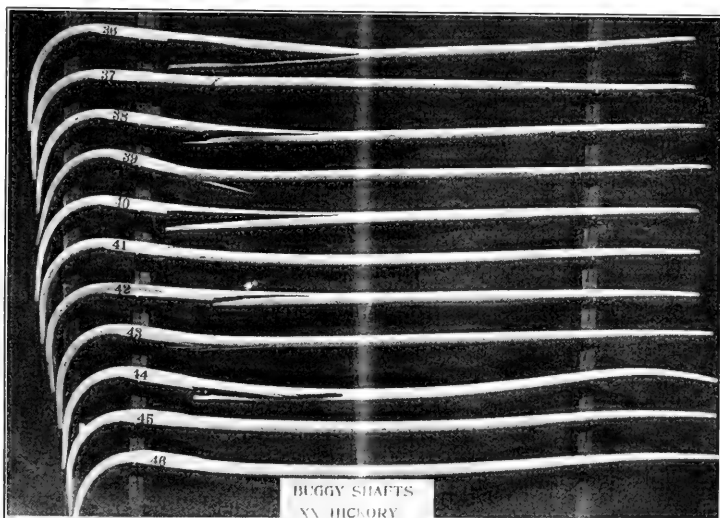
A RELIC OF OLDEN DAYS

The body of an overland freight wagon that crossed the plains of the far west before the first railroad was built west of the Mississippi River. The exterior wooden braces and the stay chains across the bed give additional strength and increase efficiency on rugged roads. Such a bed held enough merchandise for a four or six horse load.

of their own; and the government laboratory at Madison, Wisconsin, has gone thoroughly into the matter of vehicle woods and has compiled information available to manufacturers who care to use it.

Hickory's best use is as poles, shafts, reaches, rims, and spokes for light vehicles; while oak serves best as spokes, felloes, hounds, tongues, bolsters, axles, hubs, and other parts of the running gear of large wagons. Other strong woods employed in considerable amounts by wagon makers are ash, maple, elm, birch, beech, Osage orange, and locust. Some of these are selected for particular parts. Of ash they make spokes, standards, and

axles, and occasionally beds for ore wagons and frames for automobiles. Maple is very strong and it is often made into heavy axles. Elm is tough and is one of the best woods for long spokes in extra large log wagons. Birch and beech fill places similar to those filled by maple and ash. Osage orange, or *bois d'arc*, has a special place. It has often been selected in preference to

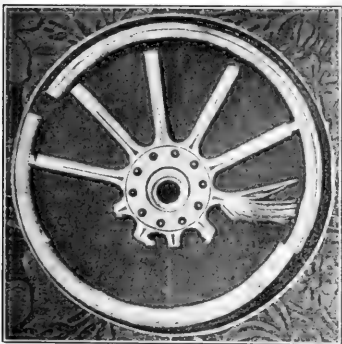


BUGGY SHAFTS
XX HICKORY

WHAT MIGHT HAPPEN IN A RUNAWAY

Manufacturers of buggies put the shafts to the severest tests to determine strength and toughness, and to discover defects. Only those which come through the ordeal unmarred are considered suitable for high-class vehicles. The accompanying illustration shows some of the defects which may be discovered by tests. The unfit ones are, of course, rejected.

all others for felloes of wagon wheels which are expected to see service in the hot, dry regions of the southwestern part of the United States, in Kansas, Oklahoma, Texas, and westward. It is extremely strong and durable, but the chief characteristic recommending it for felloes is its



RESULT OF OVERLOADING A WHEEL

The strongest, toughest wood in the world has its limitations. Overload it, and it will crush. The stubs of broken and twisted spokes in this picture betray the enormous strain under which they gave way. They are of hickory. No other wood, under the same circumstances, would have come through with as little wreckage.

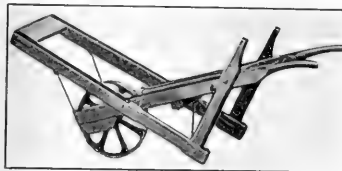
ning through deep sand, the paint is quickly worn from the felloes. Most woods, when not covered with paint, soon absorb water when exposed to dampness; but an

unpainted Osage orange felloe is polished by sand and becomes smooth like horn, and moisture has little effect on it. Nevertheless, it has its drawbacks, one of which is its lack of elasticity. Jolting over rocks is apt to break the felloe. It does best in hot, sandy roads. An agreement recently entered into among wagon manufacturers has for its purpose the elimination of this wood as a wagon material, because of the increasing difficulty of procuring it. Though it has been widely planted as shade and hedge growth, the commercial supply has always come, for the most part, from its natural range in Texas and Oklahoma, where its original home did not much exceed an area of ten thousand square miles. That is a small range for a com-

mercial tree, and the supply has become very limited. Locust is a hub wood for light vehicles. Its extraordinary strength and durability, in addition to its hardness, qualify it for use as hubs. It holds spokes firmly, resists strains and twists which would break most woods, and decay has little effect on it in many years. Elm is also a hub wood, but its place is in heavy wheels instead of light, and it is a competitor of oak in the hub factory. The tire on an Osage wagon wheel seldom becomes loose during the trying times of the hot, dry summers of the Southwest, because the wood does not shrink. Under similar conditions, tires can scarcely be kept on wheels made of other woods. In run-

ning through deep sand, the paint is quickly worn from the felloes. Most woods, when not covered with paint, soon absorb water when exposed to dampness; but an

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A SMALL BUT USEFUL VEHICLE

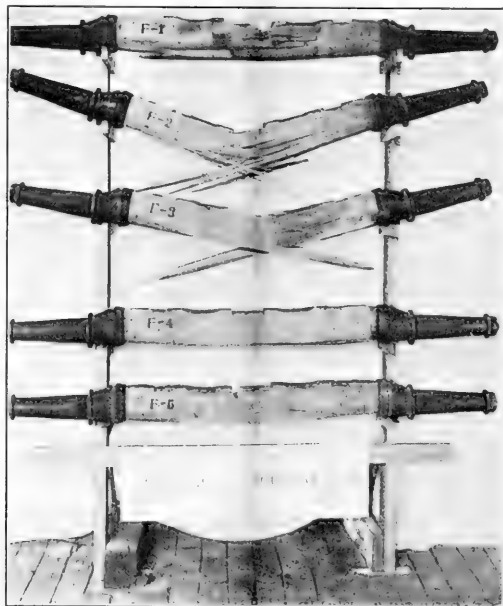
All of the important wheeled appliances transportation are not drawn by horses, oxen, or driven by motors. The wheelbarrow in some form is with us always, and there are different forms of this lowly implement. Some have one wheel, and some two, but they all are propelled by pushing. The pattern shown in the picture is for use on factory floors.

being preferred as tongues for very large and strong logging wagons and carts.

The beds or bodies of wagons call for special woods, and the choice falls on yellow poplar, basswood, tupelo, cottonwood, and red gum. The wood for bodies must be light, tough, fairly strong, not inclined to split, and it

must possess excellent finishing qualities. The finely-smoothed surface must paint well, for the show part of a wagon or carriage is the body. The lumber for the bodies or beds of farm and road wagons is known as box boards in the market, and though various dimensions may be had, boards from thirteen to seventeen inches wide, clear and sound, constitute the highest class. The foregoing list of vehicle woods contains no mention of willow, yet some willow box boards are used with satisfactory results. They are probably classed in statistics as cottonwood, or "brown cottonwood."

Fine carriages and automobiles display high grade wood finish, the automobile more of it than the carriage. The government statistics covering vehicle woods (and there are no



BROKEN IN THE INTEREST OF SCIENCE

These Douglas fir axles did not reach their present condition by accident or ordinary usage. The Government's testing laboratory at Madison, Wisconsin, broke them by powerful machinery to determine what loads they were capable of carrying. Compared with other woods the showing was satisfactory.

other statistics worth the name) do not distinguish between horse-drawn and motor-driven vehicles; consequently, it is not practicable to quote figures giving the woods used in each class; but it is a matter of common knowledge and observation that the automobile now demands most of the fine woods, both foreign and domestic, employed in the vehicle industry. The leading native woods appearing in such finish are birch, black walnut, sycamore, cherry, and butternut; and all the foreign woods on the list belong in the finish class.

Whether vehicles are drawn by animals or driven by motors, they belong in two general classes, those for pleasure and those for business.

The line of separation is not always clearly drawn, since considerable pleasure may be derived from the business wagon, and the pleasure vehicle may contribute to business. Each class is subdivided to an almost infinite degree. A vehicle need not go on wheels, for the sled or sleigh is as much in evidence as the wagon or carriage, but within certain regions. No marked difference in the material that goes to make a wagon or to make a sled can be pointed out.

Strong materials are needed in each, and woods suitable to make the bodies of one are also the kinds wanted for the other. The cutter's artistically-painted bed calls for as high a grade of yellow poplar, gum, maple, or basswood as is demanded for the panels and body of the carriage; and the bob-sled, block-sled, stoneboat, and yankee jumper are constructed of materials similar to those consumed in the manufacture of the grocery wagon and the ox cart.

The hickory racing sulky is said to have made the American race horse famous. The wood is so strong, tough, and resilient that a sulky of extreme lightness, and of remarkable endurance has been the result, and it is with-

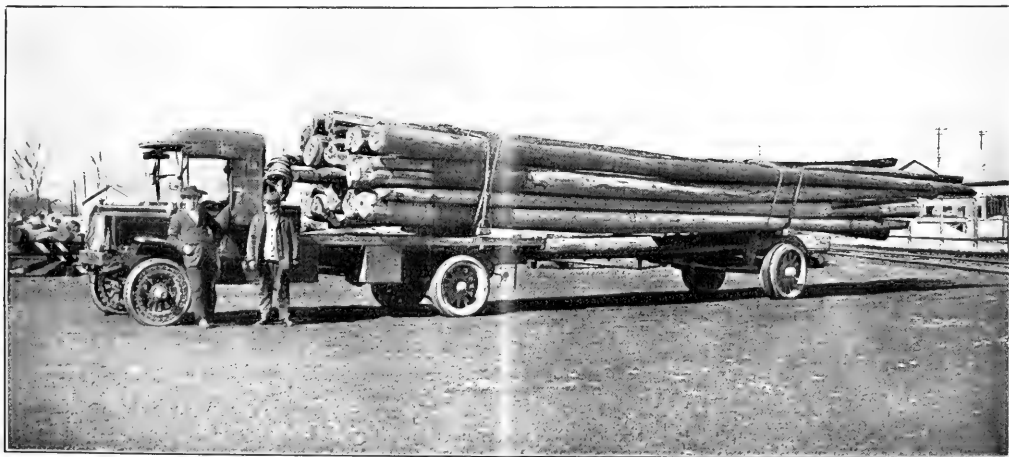


THE FAMOUS CONESTOGA WAGON

This is not a picture of a replica of the famous Conestoga wagon, but of the genuine article, though one of the last survivors of the romantic days of old, when wagon transportation was the only kind across states. This photograph was taken at Altoona, Pennsylvania, and was made available for this illustration by the courtesy of the Pennsylvania Railroad.

out an equal or a rival. This made possible the lowering of racetrack records, and in many instances the sulky wins races for which the racehorse receives the credit. However, the fact has been recognized that the hickory tree has had its part in much racing history which has redounded to the credit of American racetrack sportsmanship.

The trade wagon's place in the daily business affairs



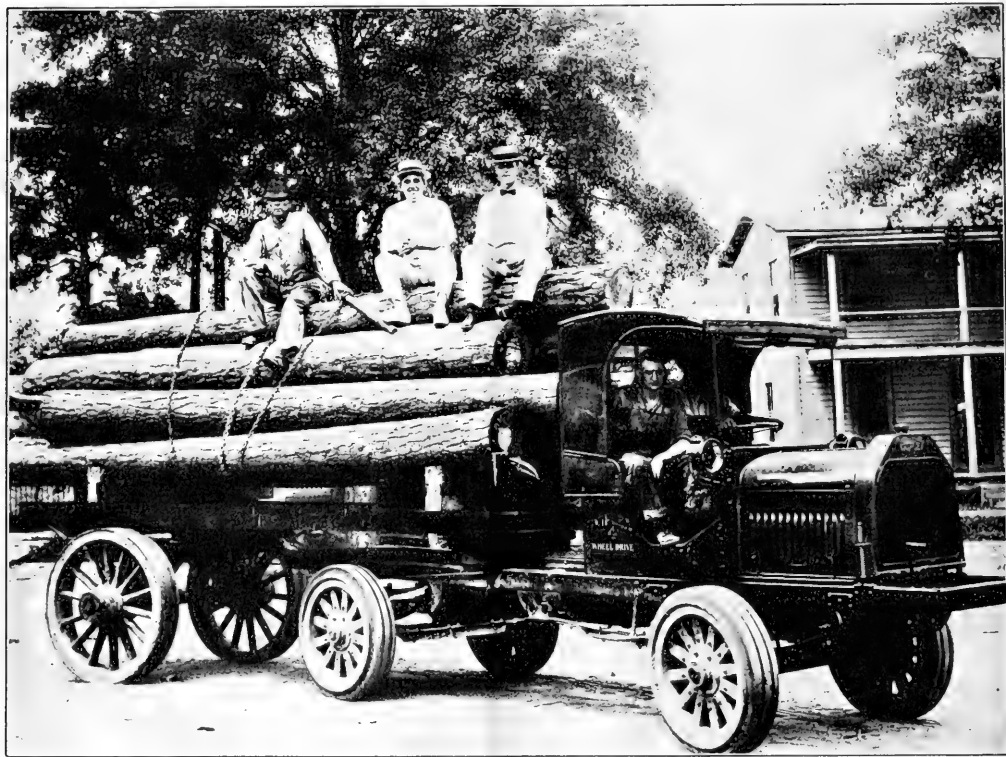
DEFEATING RAILROAD EMBARGOES

This heavy truckload of poles gives more than a hint of the modus operandi of breaking the railroad embargoes which have plagued domestic commerce so much during the past two or three years. If the haul is not too long, the motor truck takes the load and speedily delivers it at its destination. This is being done all over the country with excellent results. The cut shows the Frehaut Semi-Trailer tractor.

of the country is a conspicuous one. A special make of wagon has been provided for the baker, butcher, grocer, huckster, ice cream vender, fishmonger, flower seller, and a list of others almost interminable. Most of these are specialized in bodies rather than in gear. Each has its boxes, shelving, and compartments built to meet the user's peculiar needs. Much pine, fir, cedar, spruce, hemlock, cypress, and redwood are worked into such tops and bodies. Accompanying these softwoods, and used in the same way, are cottonwood, basswood, gum, poplar, elm, sycamore, hackberry, beech, buckeye, and other hardwoods. Much ash and some hickory are em-

now as they supplied it before railroads captured the long-distance travel.

No one man invented the vehicle, but many a man has made improvements on models already existing. Patents by thousands have been placed on record, nearly three thousand patents for springs alone. There are patents on hubs, axles, tops, and on nearly every other piece and parcel of a vehicle. These indicate growth and development, though the first vehicle made by man was so long ago that no record of it exists. Some of the ancients used sleds when they could not make wheels strong enough to carry the loads, and it was dry sledding in the deserts of



POSSIBILITIES OF THE MOTOR TRUCK

Remarkable strength and excellent speed characterize motor trucks like that in the above illustration (Duplex, Lansing, Michigan). The wooden wheels are feats of engineering, no less than the powerful motor and the rigid frame. The maximum load that may be carried is measured by bulk rather than by pounds.

ployed for bows and other parts of the tops of such business wagons and over all the tent or cover is stretched as a protection against snow and rain.

The horse-drawn stage coach, famous in the days of Charles Dickens' American tour, and later in the western experiences of Mark Twain, has nearly gone out of use; but not so with the city omnibus and the taxi. These vehicles are in the thick of business and they are largely of wood. They are passenger carriers, as the old stage-coach and thoroughbraces were, and forests supply the material

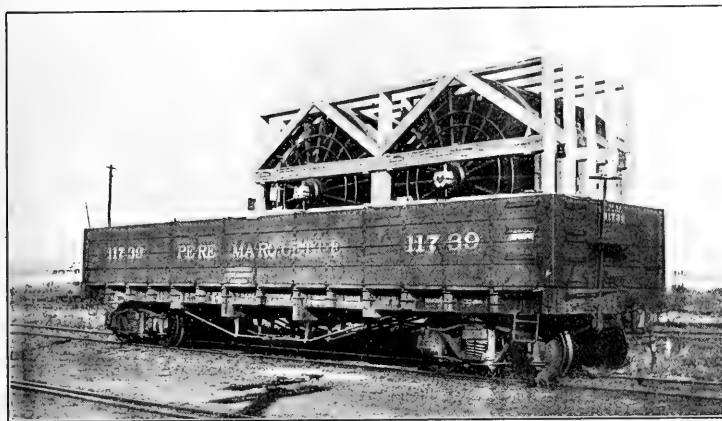
Africa and in the land of the Hittites. Yet those people knew about sleds and some of the loads hauled on them surpassed the records of the largest sled loads of logs in Michigan and Wisconsin. The ancient people had wheels also, and they had many kinds and sizes. Some were nothing more than wooden rollers like modern house movers use, and they worked in the same way. They had wheels on axles, some of them heavy for oxen, others light for horses. They made built-up wheels such as we make now. A rock carving in Syria shows a chariot

with wheels which would almost pass for automobile wheels of today, except the tires. The chariot dates from before the time of Sanballat, or 1000 years before the Christian era. The light wheels on some of the chariots

past and better than vehicles are now in the countries across the sea. That is in part due to skill in manufacturing and due in part to the excellent woods supplied by our forests. No other country ever had anything to

compare with our hickory and Osage orange in their peculiar qualities; but we have had other woods and plenty of them, and the wagon and carriage makers never lacked material. According to Burnaby, there were 9,000 wagons in Pennsylvania in 1759, and according to Filson who spoke from personal knowledge, the wagons were worth fifty dollars each, when sold at Philadelphia. The nine thousand wagons represented an investment of \$450,000 in wagons in Pennsylvania alone at that early date. The figures stand for what was left after Pennsylvania in the year 1755 had furnished wagons worth \$100,000 for the ill-fated Fort Duquesne expedition under Braddock, from which

scarcely a wagon returned. The Carnegie Museum in Pittsburgh has the tire from one of those wagons, found in recent years near the battlefield where Braddock's army was defeated by the Indians. The old tire sug-



ON THE ROAD TO FRANCE

This shipment of Overpack's Michigan logging wheels was bound for France to assist the American forces in getting out war material from French forests. The wheels are ten feet in diameter and are well known to logging contractors not only in America but in distant countries. They are manufactured at Manistec, Michigan. The spokes are of cork elm and are said to be the longest in the world for wagons.

of the ancients, of which some knowledge exists at the present time, were made of birch, sycamore, locust, fig, and other woods which now would not be regarded as wholly satisfactory for wheels. Some of them had little or no metal, and were not very different from the light wooden Red River carts of Manitoba and Saskatchewan, or like the heavier, clumsier all-wood carts used by the New Mexicans a hundred years ago. It is not necessary to go farther into the history of vehicles made in ancient times. The point is that there has been a long series of developments in the plans and the making of vehicles, and we are simply using what was in part used ages ago, and are adding to make them better. It is a notable fact that the American Indians knew nothing of wheel conveyances. It is not known that they ever made or used a wheel of any kind, unless their discoidal stones be regarded as such, and they were only playthings. But they had a rude sled consisting of two poles on which they placed the article to be moved, and thus dragged it along the ground.

American vehicles are now better than they ever were in the



A TRACTOR DOING STRENUOUS WORK

It begins to look as if tap line railroads may soon be dispensed with in logging operations, if tractors continue to expand their spheres of usefulness. The accompanying illustration represents an Avery tractor (Peoria, Illinois), hauling logs on Powell Brother's operation near Elton, Iowa. Ox and horse teams are back numbers there.

gests a story in wagon improvement since then. It was made in sections, each section being fastened to the fellows with iron bolts, the heads of the bolts protruding through the tire, like cogs on a wheel, but spaced farther apart. In wagons of that kind the fellows were made thick and strong and they supported the tire; but the modern tire supports the fellow. The change in construction shows a great improvement in wagon wheel building in one hundred and fifty years.

The most famous wagon ever made in the United States or in the world was the Conestoga. It had its name from the name of the town in Pennsylvania where the earliest were manufactured about the time of the Revolution. The name appears to have been applied later to wagons of the same type made elsewhere, notably those manufactured at Newton, Virginia. During the westward movement, when families trekked to new homes beyond the Mississippi, wagons of that kind carried them, and were known as "prairie schooners," and still further west they were sometimes designated as "ships of the desert," though that name was a borrowed term rightly belonging to the camel in eastern lands.

The Conestoga wagon was a really important agent in American history and romance. Its front wheels were small, rear wheels high; the hubs were enormous; the body was high in front and behind and projected far over the running gear fore and aft; a white cover was stretched over the bows, providing a waterproof roof, lynch pins held the wheels on; brakes, commonly then called "rubbers," checked the wagon's speed descending steep hills; and the inevitable tar bucket swung from the rear axle. The tar was the lubricant for the "thimble-skins"—the metal-covered wooden spindles on which the wheels turned. It was pine tar and it had an odor which has been described as "enduring from everlasting unto everlasting." The highways along which those old Conestogas traveled smelled perpetually of the pine tar dripping from the hubs of passing vehicles.

The Conestogas were the freight carriers overland before the days of railroads, and convoys of them made ambitious journeys. A famous route led from Philadelphia and Baltimore to Nashville, Tennessee; but that was not the longest route. One led from the Mississippi River through New Mexico to Chihuahua in Mexico. Over that long route the wagons carried merchandise, and those who drove the wagon trains across the Indian country always went prepared to fight the redskins. It was the same with the long emigrant trains which journeyed to the Pacific Coast from the Mississippi or the Missouri Rivers. Writings relating to the frontiers of that time are filled with references to the Conestoga wagons. Among those who recorded the perils and romances of the overland pilgrimages were John James Audubon; Francis Parkman; James, Prince of Weid, and Zebulon Pike, names famous in frontier history and travel.

Of the horse-drawn vehicles those used for pleasure were the first to yield to the automobile. Between 1906 and 1916 the manufacture of horse vehicles, other

than farm wagons, declined sixty per cent. The automobile's inroad upon farm wagons has not been so great, but it has been considerable. The total number of vehicles of all kinds has probably not decreased, and it cannot be positively stated that the quantity of wood required in their manufacture has declined. Automobiles require considerable amounts of wood in their construction, but they also use much metal. Some of the best automobiles are built with wooden frames, and practically all motor vehicles are trimmed with high class woods.

FREE TREES FOR PLANTING IN PENNSYLVANIA

A LARGE supply of extra fine forest tree seedlings will be available for free distribution this spring, has been stated by Commissioner of Forestry, Robert S. Conklin. This is a real opportunity. Anyone who wants to plant forest trees this spring may have them for the asking. There are no strings to the offer, the only condition being that applicants plant not fewer than 500 trees, pay for the packing and transportation, and actually set out the trees in Pennsylvania for reforestation. The trees may not be sold and no orders for ornamental stock will be filled.

The stock available for free distribution is almost all three years old and includes white pine, red pine, Norway spruce, European larch, *Arbor Vitae*, and a limited quantity of Japanese larch and white ash.

Last year over two million trees were planted by private owners of forest land in Pennsylvania. Applications for almost one million trees have already been received for the spring planting of 1919. Hence orders should be sent early for the supply of certain trees will surely be exhausted, and the number available in subsequent years will be considerably reduced on account of the difficulties experienced during the past few years in purchasing forest tree seed. Application for these trees should be made to the Commissioner of Forestry, Harrisburgh, Pennsylvania.

BEWARE THE ASH-WOOD BORER!

WOOD boring insects were responsible for the loss to a Mississippi lumber company of more than a million feet of ash logs, according to reports of investigators of the Bureau of Entomology recently. It was during the manufacturing operations to meet the war time demand for ash oars, ash handles and other supplies.

The company had failed to provide for prompt utilization of the logs after the trees were cut, and the destructive ash-wood borers got busy in regiments and divisions.

The bureau lately has been devoting its energies to advising lumbermen and others interested in successful methods of combating the pest, in the hope of preventing a spread to other sections of the country.

WALKS IN THE WOODS

(I) THE NEPPERHAN VALLEY IN WINTER TIME

BY J. OTIS SWIFT, AUTHOR OF "WOODLAND MAGIC"

(WITH PHOTOGRAPHS BY THE AUTHOR)

IT IS bright and sunny outside the house here in The Manor. The inch of snow on the ground is melting wherever the sun strikes it. The day grows warmer. The blue of the distant Ramapoo Mountains, clear and bright as turquoise this morning, is growing dim now as the haze rises from the shining Hudson. The grim Palisades turn from purple to gray and brown across the river. It is a winter day full of grandeur. Mile upon mile of rolling country over beyond Tappan and The Reaping Hook suggest big thoughts and sweeping impulses as I gaze from this ridge of hills. But all the morning I have had a more intimate desire in my heart. I have wished to see and study a more humble part of the universe about me. You will laugh, I am sure, but I have been wishing to see, to make sure down to the smallest detail, just what this bitter winter has done to the little frog pond over the hill at the foot of the old woodroad in the Nepperhan Valley.

Kings have their courts, and emperors their botanical

gardens, but not one of them is more wonderful than this little three-acre button-bush circled, flag-waded, lily-dotted home of painted turtles and pollywogs. The greatest landscape gardener in the world, who works day and night, summer and winter, without salary and for pure love, laid out its mystic mazes and hidden grottoes. You know the place in summer! A very tangle of wild frost grapes, wild beans, sumach, Benjamin-bush and sassafras, surrounding a half dried up shallow of green cow-lily padded water, reeds, grasses and marsh marigold and mallow!

To get there we go over through the grounds of the New York Juvenile Asylum and down an old twisting woodroad. Once this woodroad was a colonial lane from Hastings to Tuckahoe, and Washington's troopers pass-

ed this way. Before that, legend says, it was the old Algonquin trail where the Iroquois came down from Central New York in the autumn to eat clams and oysters along the Sound in winter. It comes down from Tappan over the Palisades into the Lawrence Estate intersecting the Palisades Interstate Park on the west side of the Hudson. The Dutch settlers made a roadway of it on this side. Christmas ferns, rock ferns, jack-in-the-pulpits, bloodroot, Dutchmen's-breeches, windflowers, fairy-cup moss, sarsaparilla, and a hundred other beautiful little denizens of the wildwood grow among the lichen-covered stones down this old forest wood path.



THE OLD WOOD ROAD DOWN INTO NEPPERHAN VALLEY AND THE FROG POND

Overhead are white and red oaks; dead chestnut trees, gaunt and skeleton-like in their barkless nudity; great old tulips that are glorious in the spring. To-day there is a hush in the wood. Chickadees chirp vaguely. White breasted nuthatches run head downward over the bark of the black birches, saying softly, "Crank! Crank!" But it is not the hush

of death. Only the chestnuts are dead—and even they are not dead, for they struggle up in shoots every spring, about the roots. Will the parasite disappear before they are quite gone? Far and wide through the forest we are almost conscious of the breathing of the trees in their winter sleep. It is the rest time, preparatory to spring's reincarnations.

The tall, dry stalks of the lobelias rustle disconsolately, their old clothes in the wind—like ghosts shaking their shrouds about them. But, oh my friend, kneel down here in the dead leaves by this clump of black haw and I'll show you the ever-new miracle of reincarnation. Carefully we dig away the snowy leaves and decayed vegetable mould about the roots of the lobelia, and discover a nursery with two or three babies sleeping healthily. Each

baby is an off-shoot from the mother stalk of the lobelia, waiting patiently for next spring's hush-a-bye baby songs through the undergrowth. The under world of the loam, just below the dried leaf coverlet, is verily whispering with life and energy. The ground is not frozen here in this warm corner. Our fingers uncover elongated cucumber-roots, jack-in-the-pulpit corms, tiny, globular, bulb-like roots of many of the early spring flowers; the hard nut-like tuber of the spring-beauty, the fleshy roots of the dog-tooth violet—all very much alive and waiting with

They stand dry and sere on little islands knee deep in ice, now. The wind rattles their hard little seeds like pills in a box. Beyond the marsh-mallow are yards and yards of wild rose bushes, their red tips glowing brightly. Our grandmothers used to gather some varieties of them to make into jellies. Along the far shore is a jungle of button-bush, covered now by dry, round balls, but last summer making the bank look a bevy of brides in their veils, the white flowers densely gathered in rounded peduncled heads.

We go gingerly out on the ice, and on a far little island, hidden behind clumps of elderberry where the cedar waxwings, bluebirds and starlings feasted last autumn, come upon a large high-bush blueberry. It should have borne several quarts last year, but no one could have picked them, and only the birds could have known of the banquet—though dozens of boys passed within a few rods on their way to school. Along the shore where in summer painted turtles sun on rotting logs, the dry stalks of arrowleaf, cat-o-nine tails, calamus root, water arum, cardinal flower and countless other free citizens of the bog greet us as we pass. The farmers have been trying



THERE ARE DENSE MASSES OF BUTTON BUSH ON THE FAR SHORE

almost throbbing interest for the first warm rays of the sun-god to call them in the spring.

No, there is no death here! Only eternal, everlasting life, incarnated again and again. Mother Nature kneeds over and over this black earth to give form and fibre to the souls of her plant children—for if they have not souls what is the thing that is not matter, in the trillium, the painted emblem of the Trinity? They are reincarnated over and over, these wanderers of the wild places. This tangled, sprawling root of wild ginger, *Asarum canadense*, was black loam a few years ago. It will be black loam a few years hence. But in its crawling, snake-like roots is a spark of life as old, almost, as anything in the world. It has come down the centuries, undying, this particular thread, but constantly reincarnated. It is as old as you or I. But let us get on to the frogpond! We clamber down over gnarled root and mossy logs.

There is ice on the pond. The thin sheet of snow is tracked with the feet of rabbits, squirrels, meadow mice, mole shrews, and crows going to the air holes—and something, perhaps only the wind, has been scattering the seeds of the marsh mallow over the white coverlet. What a glorious sight these marsh mallows were last August, staining great patches of the swamp with pale rose color!



A QUIET SPOT UNDER GIANT OLD OAKS AND TULIPS

to exterminate them for hundreds of years, but these persistent democrats flourish on from year to year, fulfilling their duty of making the waste places beautiful.

There is a sense of mystery revealed in walking about a frozen bog in winter. The catbird's nest that defied you last July while its owner fluttered before you through the watery jungle, mimicking every bird in the swamp and many out of it, is plainly revealed now, a little handful of sticks laid carelessly across the crocheted twigs of the cornel bush. It is half full of snow, but there is still the air of a home about it. Close down by the door of old Musquash's reedy house—the muskrats built high

this year in anticipation of floods next spring—an owl has been tearing away the dead grass of a meadow mouse's nest, looking for his supper. Did he get him, we wonder. There are tunnels under the snow, new made. So probably Bubo was disappointed.

There is color enough about the swamp, even in winter time, to delight the eye of an artist. The thin willowy shoots of the cornel, the red-osier dogwood, are turning blood red; the willows are brown and yellow; the sassafras bark is paint-green, the color country folks used to paint their house blinds; the ben-zoin, or spice bushes, are black with yellow buds ready to break open before the leaves come in the spring; the climbing bitter-sweet with its scarlet seeds in orange pods; the crimson and rose pink fruit of the burning-bush—did Moses see its cousin in the desert?—drooping on long peduncles; and the drooping cymes of orange and scarlet berries of the woody nightshade, *Solanum dulcamara*, give a glory and a vividness to the tangled masses of

vines and shrubbery that advertises the swamp for what it is, one of Dame Nature's own banquet halls for the winter birds which we will not be able to entice to our feeding stations in the gardens until they have exhausted

the bounteous feast here. As we go homeward, the cobwebs of the week's work cleared from our brains, we wonder again that any inventor of theological system should have guessed that this beautiful world was made solely for mankind: witness that while we in America may be skimping our food to humanely send it to starving Europe, this nice old lady, Mother Nature, whose realm we have been exploring this winter day, has laid a banquet in every swamp and bog and woodland tangle clear across America, that her wild, joyous little animated airplanes and concert givers may have plenty

to eat through the long sleep-time of plants and insects. And were it not for her birds and her insects, notably the bees, we'd have no crops to send to starving Europe. So we conclude the dear old lady must love us, too.



CAT-O-NINE TAILS WITH DRIED STALKS OF MARSH-MALLOW BEHIND, THEIR SEED PODS RATTLING IN THE WIND

A NATIONAL PARK TO HONOR ROOSEVELT

THE suggestion made by Charles Lathrop Pack, President of the American Forestry Association, that a great national highway be named in honor of Theodore Roosevelt, has met with popular approval from coast to coast as evidenced by cordial expressions and endorsements in the press. This is closely followed by a sentiment in favor of naming one of the National Parks in honor of Mr. Roosevelt also and Senator Phelan, of California, makes this definite by the introduction of a bill to create a national park on the western slope of the Sierra mountains "to be dedicated as a national memorial to Theodore Roosevelt."

This is a departure from the principle hitherto maintained in the matter of naming national parks, but sentiment favoring it is strong. Robert Sterling Yard, chief of the educational division of the national park service, is an earnest advocate of the proposal. He says:

"Senator Phelan's selection of a national memorial to Roosevelt is remarkably appropriate in many ways. California's memorial to John Muir, her own naturalist, author and prophet of the out-of-doors, was a trail over the crest of the Sierra from Yosemite valley to the summit of Mount Whitney, the loftiest peak in the United States.

"The nation's memorial to Roosevelt may well be the 1,600 square miles which inclose America's greatest

grouping of stupendous rugged mountains, her most exuberant valleys, her most luxuriant forests, and a million trunks of the giant sequoia tree, including the General Sherman tree, biggest, oldest and lustiest living thing in the world.

"This proposed national park, which slopes westward from the crest of the Sierras eighty miles or so south of Yosemite, is regarded by the Department of the Interior as the greatest in some respects that America can produce. No name has yet been chosen for this park; it was difficult to find one which carried the idea of its superlative ruggedness and vigor. The name of Roosevelt seems to epitomize and express these characteristics."

EMMETT D. GALLION, law partner with the late Senator Daniel, of Virginia, and for many years connected with the Interior Department, left a will bequeathing his entire estate, consisting of 750 acres of valuable timber land at Green Bay, Virginia, to the State forest service of Virginia.

All of testator's property, real and personal, is given to the State of Virginia for the benefit of its State forest reserve, his possessions to be used as a forestry reservation under the management of the State Forestry commission.

Forestry for Boys and Girls

by E. G. Cheyney

THE PINE WOODS FOLK

SQUEAKY CHIPMUNK COLLECTS SOME SEED

NOW that Squeaky Chipmunk had learned the proper time to collect pine seed for his winter stoves, the next thing was to get the seed. He was sitting out on the old pine log which formed the roof of his cozy little home and he was talking over the problem with Mrs. Squeaky who was squatting comfortably in the doorway.

"I ought not to have stolen that cone from Chatter Box the other day," said Squeaky sadly. "If it were not for that, I think he would cut me down some cones when he cuts his own."

"Maybe he will not find all that he cuts down," said Mrs. Squeaky consolingly.

"He may overlook a few," said Squeaky, "but very few unless he cuts a great many at a time. Then he sometimes loses track of them."

"Oh, well," said Mrs. Squeaky trying to comfort him, "he surely will not cut them all, and when the cones open on the trees and the seeds fall out we can gather them up."

"Yes," said Squeaky, "we can always get them that way, but it is very slow work and very tiresome. Here comes Chatter Box now."

They both sat very still and watched Chatter Box, the red squirrel, come bouncing through the woods towards the big Norways. He ran straight to the tallest one, ran up it a few feet, and stopped to look around. He immediately saw the two Squeakys watching him.

"So there you are, you little thief," he called to Squeaky, "waiting for a chance to steal some more of my cones are you?"

"No," Squeaky assured him, "I am not going to steal any more. I would not have stolen that one the other day only I got so hungry watching you eat that I simply could not stand it

any longer. I was wondering whether I could not get you to cut me down a few while you were up there."

Chatter Box climbed up a little farther and took a seat on the stub of a limb.

"I like your nerve," he said from his new position. "Steal from a fellow one minute and ask him to help you the next." He looked at Squeaky sharply with his bright little eyes and paused. The next thing he said made Squeaky fairly jump for joy and then feel very much ashamed, indeed. "But," he continued, "I suppose I might as well cut you down a few just to be neighborly, for to tell you the truth I did not intend to eat that cone you stole the other day anyway. I had had enough and was going to give it to you."

With that he scampered on up to the top of the tree and began cutting off cones at a great rate. They fell so fast that it seemed to be almost raining cones.

"Help yourselves," called Chatter Box, "there are plenty of them."

They did not wait for a second invitation. They scuttled off into the brush and were soon carrying in cones as fast as they could run.

Pretty soon Chatter Box came sliding down the tree to pick up some for himself.

"Thank you ever so much, Mr. Chatter Box," said Mrs. Squeaky politely. "It would have taken so many days to pick up this much seed loose on the ground."

"That's all right," said Chatter Box. "I always lose a great many anyway. All of us do. We are forgetful and we forget where we have hidden them. Do you see those three big trees over there so very close together? My great-great grandfather planted those. He buried a cone there and forgot it. Those three are the only ones left."



"Isn't that wonderful," said Mrs. Squeaky. "You must feel very proud of him now. I have often wondered where those bunches of little trees came from."

"That's the way it happens," said Chatter Box pleasantly, "they have come from forgotten squirrel caches.

So you might just as well have the ones I would lose and I'll be more careful with the rest."

He scampered off to collect some cones for himself and left Mrs. Squeaky to explain the mystery of the little groups of pine trees to her husband.

THE BALSAM AND THE BIRCH

Said the little balsam seedling to the big white birch
You tower up above me like the spire of a church,
But the day is fast approaching and it's not far away
When I'll be growing faster than you dream of today.
I shall still be growing upward when you have reached your height
And then I'll drop my leaves on you with all my might!

THE CONIFERS WHICH ARE NOT EVERGREENS

(ANSWER TO BOY SCOUT QUESTION NO. 1)



HERE are in the United States just two genera of coniferous trees which drop all of their leaves, or needles, in the winter like the broadleaved trees. All the other conifers, or cone-bearing trees, drop some of their needles every year, but always retain enough of them to be called evergreens.

One of these genera is the larch, of which there are three native species, one in the lowlands of the Rocky Mountains and the West Coast, one near the timber line on the very high mountains of the west, and one, the tamarack, in the swamps of the Northeast and around the Great Lakes. The needles on these trees turn a quite brilliant yellow in the fall, about the time that the hardwood leaves are turning, and later fall off, leaving the tree bare through the winter. The fresh, green needles of spring, arranged in rosettes on little bumps along the twigs, make them very pretty.

The other genus, of which there is only a single species, is the bald cypress. It is one of the largest trees in the Eastern United States, and is found only in the swamps of the southern states. Like the larch, it sheds its needles and many of its smaller twigs in the fall and remains bald through the winter.

It has another and very interesting peculiarity. Since its roots are almost continuously under water and therefore very much in need of air they send up peculiar growths, resembling irregular cones, to the surface of the water. These are known as "cypress knees" and there are often dozens of them rising from the roots of a single tree. Where the water is deep the roots are tall, where the water is shallow, they are short. If you wade around a cypress tree, you will certainly discover some of the knees that are below the surface of the water, even if you do not see any above it.



SNOW IN THE WOODS

(ANSWER TO BOY SCOUT QUESTION NO. 2)

THERE will probably be a great difference of opinion as to the relative amount of snow in the woods and in the open, depending upon the time of year that the observations were taken. Owing to the tree canopy, the radiation from the earth and the shade, the temperature changes more slowly in the woods, and it is never quite as hot or quite as cold as in the open. If there is no sunshine, the first snow in the fall will probably disappear more rapidly in the woods than outside, but with sunshiny days and the cooling off of the ground the shade in the forest begins to tell. Later snows last longer in the woods and accumulate there so that toward the end of the winter the snow lies much deeper in the woods and lingers there for many days after it has disappeared in the open fields.

PROBLEMS FOR NEXT MONTH

- (1) Does the tamarack or cypress or cedar grow faster in the swamp or on high ground?
- (2) An ash and a sugar maple are growing close together, which one keeps its shape the better?

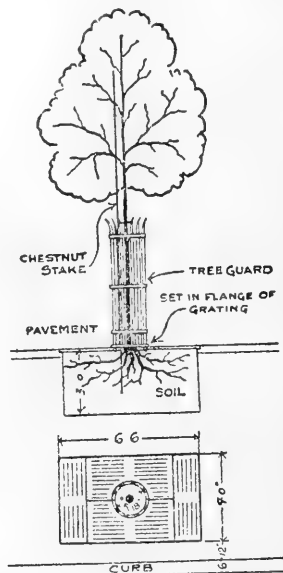
GRATING SOLVES CITY TREE PROBLEM

TO INDUCE trees to grow and flourish in city streets and small parks has always been a hard problem for foresters and city beautifiers. Even now, though great progress has been made, none is hopeful of producing large trees or prolonging their lives more than a comparatively few years. The chief obstacles to tree growth in city streets are lack of root room, scarcity of moisture, and the quick depletion of soil fertility which cannot be renewed through asphalt and cement. Even where a large opening about the tree trunk is left in the paving material, the tramping of myriads of feet soon renders it almost as solid as the stone sidewalk.

Paris was one of the first cities to seek and find means for prolonging shade tree life. The initial move was to cover the open space about the tree trunk with an iron grating that sustained the foot traffic and prevented packing. This idea was taken up and extended by other cities till now New York has a system in vogue a little in advance of all others. This city had to contend with not only the tree troubles of other cities, but there is hardly a spot in Manhattan where the natural rock is not within a few feet of the surface.

The accompanying illustration gives a detailed sketch of a tree-planting specification under which the Manhattan Park Department contracts for the work. First, an excavation 4 by 6 feet and 3 feet deep is made where the tree is to stand. This is filled in with good quality soil to within six inches of the top and the tree roots well tamped. An iron grating in two parts the full size of the excavation, with an 18-inch circular opening for the tree trunk, is then set in, resting upon the sidewalk

material. This large area of grating lets out gas, steam, and other harmful substances that are constantly escaping from under ground pipes and which are harmful to tree roots. It also allows a considerable amount of rain water to reach the roots and permits aeration of the surface soil under the grating. Mr. J. S. Koplan, the park forester, has devised a flat steel cultivating tool with which the soil under the grating may be stirred and loosened two or three times a year, which also prepares it for the reception of liquid fertilizer poured through the grating.



**A Way to Keep City Trees Alive,
Showing the Grating to Save
the Roots from the Pressure
of Countless Feet.**

Mr. J. P. Morgan was one of the first New Yorkers to try the new device. Trees planted in front of his residence in Madison Avenue several years ago are doing nicely, where trees set under the old plan had invariably failed. In Kenmare Park, at Kenmare and Lafayette streets, the Park Department has a plantation of fine trees, each with an 8 by 8 foot grating, the larger area being used because of the poor natural soil conditions. One of the newest and most attractive plantations of street shade trees has recently been completed by the American Geographical Society around its building at 156th street and Broadway. In this instance, semi-circular wrought iron grills, with a 6-foot diameter at the curb line, have been used. The trees are 8-inch Oriental planes, 30 feet high, selected by the City Park Department from among hundreds in the nursery. There are eleven of the trees, and the fact that Oriental planes were selected proves that that park forester does not expect another such severe season as last winter, when nearly all the plane trees in the city were killed by the cold.—*New York Times*.

TRENTON'S BIRD-HOUSE BUILDING CONTEST

BY M. M. BURRIS

CITY FORESTER, TRENTON, N. J.

BELIEVING in preventive medicine, and knowing that our native insectivorous birds are a strong factor in the suppression of insects attacking our trees I urged a campaign for the starting of the bird-house building contest.

Park Commissioner Burk was very interested in this campaign and was willing to offer prizes for the best bird-houses. We enlisted the services of Mr. W. R. Ward, director of Manual Training of Public Schools, and our plans for a lively campaign were soon formulated.

It was decided to open the contest to the boys of the fifth, sixth and seventh grades. The following announcement was sent out to the schools:

1. Every bird-house must be suitable for one or another of the following birds: Bluebird, robin, chicka-

prizes. We were successful in instilling civic patriotism into the hearts of about a thousand anxious boys who were soon ready to start with their saws and hammers.

But before they started, they were told that these bird-houses were to be built from scrap or waste lumber, boxes, branches, logs, or anything which could be used.

The boys responded good and strong. About a thousand boys started in the contest. Soap boxes, tin cans, scrap lumber, buckets, funnels, flower pots, logs, bark and every other conceivable material which could be worked into a bird-house were brought into the manual training rooms. The boys were busily engaged studying plans of bird-houses which we had prepared for them, and they soon flocked to the Public Library in search of information regarding birds and bird-houses. They



PROUD TO POSE FOR THEIR PICTURES

This picture shows some of the boys who took part in the contest and the bird houses they built, standing in front of the Municipal Building.

dee, white breasted nuthatch, house wren, martin, song sparrow, phoebe, red-headed woodpecker and sparrow hawk.

2. Only boys in the fifth, sixth and seventh grades in school may enter the contest.

3. All bird-houses must be well constructed and properly painted or otherwise covered to protect them from the weather.

4. The contest closes April 1, 1918.

5. All bird-houses are to be given to the City of Trenton to be placed in the various parks.

The boys were told that by entering the contest they would have lots of fun, learn something about birds, help to attract the birds to our city, and might win a prize. Very little emphasis, however, was laid on the

were told to be original and not to copy each other's designs. They were given the necessary data for the design of the house for whatever bird they were going to construct it, but the details were left for them to decide upon.

The boys were soon busily engaged with their tools—all of them interested, heart and soul in this project. And when the contest closed about twelve hundred bird-houses were completed. A display of unexpected skill in design and construction. Indeed, they were truly the work of craftsmen.

They were proud of their work and they were granted the privilege of a parade. How proud they were as they marched to the City Hall, each boy carrying his own bird-house. Some of the bird-houses were so large that

little carriages were employed to cart them in the parade.

The boys were lined up in front of the City Hall, and Commissioner W. F. Burk, in the name of the city, thanked them for their act of civic patriotism. The boys were glad in having done their bit, a photograph was taken of them with their bird-houses and is here reproduced. The boys then brought their bird-houses to an exhibition hall in the heart of the city where the bird-houses were displayed.

Three prominent citizens were selected to act as judges. It was originally planned to give only twenty prizes, but it was so difficult to pick the winners, that the judges decided to give additional special prizes. Crowds thronged to the exhibition hall and the bird-house display was the talk of the city.

The bird-houses were carted over to the parks where a portion of them were placed on the trees. Not only are they of beneficial value but they helped beautify the parks. Commissioner Burk distributed them also to

Without the co-operation of Commissioner Burk and Director Ward, the campaign would not have been such a success. Commissioner Burk's mere presence in the school was an inspiration to the boys. He appealed strongly to the boys and they responded. Director Ward had a very efficient staff of teachers in his manual training department and his services were indispensable to the cause.

As a fond lover of birds, and appreciative of their power of insect control, I was greatly satisfied with the results of this campaign.

A Bird Fountain For Roosevelt

The National Association of Audubon Societies and its affiliated State Organizations, Bird Societies and Sportsmen's Clubs throughout the country, will at once begin the work of providing for the erection of a notable work of art, to be known as the Roosevelt Memorial Bird Fountain. The plan was originated by T. Gilbert Pearson, the Secretary of the Association, and is being enthusiastically received

by bird-lovers all over the country, for Colonel Roosevelt was one of the most forceful champions of wild life conservation the world has ever produced.

It is understood that the most eminent sculptors in America will present plans for the memorial bird fountain. Its

location will be probably in New York or Washington City. A National Committee of Nature-Lovers and Sportsmen will advance the project and Mr. Charles L. Pack, President of the American Forestry Association, has accepted a place on this committee. Contributions for the fountain fund may be sent to Dr. Jonathan Dwight, Treasurer, 1974 Broadway, New York City.



A PRIZE MARTIN HOUSE

Best of all, it was built by a deaf and mute boy of the sixth grade.



THE PRIZE WINNERS

These attractive bird houses were the ones that carried off the trophies.

to Long Branch. Yes, we were very proud of the results. The boys learned a good deal about birds and became ardent admirers of them. This enterprise brought to the city twelve hundred bird-houses, at no expense. Trenton has responded to the cause of our feathery friends and promises to be their protector.

FORESTRY IN DIXIE

IF HORACE GREELEY had been a forester and had lived in 1919, his famous advice to the young American would have been "Go South, young man, go South!" and to the young Southerner, "Stay South, young man, Stay South!" For if ever there was a field and an opportunity for the ambitious forester, it is in the old South, from Virginia and Missouri to Florida and Texas. Not only is there a field for the forester, but more important yet, there is a wonderfully wide field for forestry. While the East, under compulsion of a real dearth of local timber supplies, has for fifteen years been practicing at least the rudiments of forestry; and while the West, under government ownership of immense bodies of timbered land, and under the scourge of timber-destroying fires, has for as long, or longer, studied the problems of forest conservation and applied their solutions, the Southeast has, with a few notable exceptions, not yet awakened to the need for forestry. But the South will not long remain blind to this great movement, and can already point with pride to 1,837,000 acres of National Forests, in Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, Tennessee and Arkansas; to state forestry departments and forestry

associations in Virginia, West Virginia, North Carolina, Tennessee, Louisiana and Texas; and to instruction in forestry in the state colleges of North Carolina, Georgia, Tennessee, Missouri, Louisiana and Texas. But with no state forestry department in eight Southern States, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Missouri and Oklahoma, and a total forestry appropriation in the six named states now having departments of but \$42,900 in 1918, there is presented to the thoughtful Southerner a pressing need for increased effort and a determined campaign for forestry legislation, study and action.

Never can there be a more propitious time for pushing forestry in the South. In recent years a great awakening has taken place to the vast acreages of waste and idle land—cut-over and swamp-land—that lie within the boundaries of the Southern States. Beginning with

the Cut-over Land Conference of the South, held in New Orleans in April, 1917, a powerful movement has gained headway, constantly looking to the development of the South's greatest single asset, her warm and fertile soils. It is but natural that in this development the greatest prominence has been given to those uses of the soil, farming and grazing, that promise an immediate cash return. There has been a natural tendency, in the first flush of their enthusiasm over their newly discovered asset, for Southern land owners to class all their cut-over lands together as valuable farming soils, and in the absence of anyone to tell them differently to look upon the possibilities of tree growing as too unremunerative to be worth consideration. Now is the time for the forester to come forward and show the owner of young second-growth timber the value of his property, to point out to him how fast it is growing, how valuable it will shortly be, how simple a thing it is in the South

to renew our fast-disappearing forests. Now is the time, before the land speculator can get in his deadly work on a large scale, for the forester to present and push his program of land classification and thereby effectively prevent the repetition of that great economic and social



SOME OF THE FORESTERS WHO ATTENDED THE BIG MEETING AT JACKSONVILLE

tragedy which elsewhere has followed attempted agricultural development of land that never should have been farmed. Now is the time for the forester to link together in the public mind fire protection for improvement of the range and enrichment of the soil, and fire protection for the encouragement of second growth.

The conference of Southern foresters held at Jacksonville, Florida, on January 3rd and 4th, with a field trip on January 5th, brought out all of the above mentioned points. That meeting, engineered in part by the Louisiana Department of Conservation (as was last year's meeting at New Orleans, the first meeting ever held in the far South of professional foresters), and in part by Sydney L. Moore of the Sizer Timber Company, of Jacksonville, and Austin Cary, of the United States Forest Service, was remarkable by reason of three things: First, the attendance of the state foresters of

six Southern States, as well as members of the United States Forest Service, professors of forestry and other foresters working in nine different states; second, the presence and active participation of the Secretary-Manager and Assistant Secretary of the Southern Pine Association, the Secretary of the Georgia-Florida Sawmill Association, and the Secretary of the Turpentine and Rosin Producer's Association; third, the active interest and wide connections of the Florida delegates, who included the manager of the Florida Tick Eradication Committee, the chairman of the Conservation Committee of the Florida Federation of Women's Clubs, and several state officials and members of the Florida legislature. We venture to say that the meeting received wider publicity from the trade journals and newspapers of the country—thanks to the initiative of those agencies in having representatives in attendance, than any previous forestry event taking place in the far South. The proceedings of the meeting, which were conducted informally with few prepared papers, will be gotten out in mimeographed form by R. D. Forbes, Secretary of the

Conference, Department of Conservation, New Orleans, Louisiana.

The topics under discussion included "Forest Investigations," "Railroad Fire Protection," and "Publicity and Education," on the first or professional day's sessions, presided over by State Forester Holmes of North Carolina, in the absence of Col. Henry S. Graves, Chief Forester of the United States Forest Service, who was ill. On the second, or open, day's sessions, Secretary J. E. Rhodes of the Southern Pine Association presided, and started off the meeting with the remarkable statement that within five years 3,000 southern pine mills would cease operation because their stumpage will be exhausted. "Forestry and the Forest Industries," and "Cut-over land Utilization," occupied the meeting, prior to a discussion by the Florida delegates of a proper forestry code for that state. The meeting came to an end, except for a most enjoyable field trip to Starke, Florida, on the following day, with the passage of appropriate resolutions, embodying most of the ideas presented at the beginning of this article.

THE FORESTRY SITUATION IN NEW SOUTH WALES

THE special Australasian correspondent of the *Christian Science Monitor* writes from Sydney that the need for a complete and consistent state forest policy in Australia has occasioned much recent legislation on the subject, culminating in the new Forestry Act of 1916, which repealed the old Act of 1909, bringing law on November 1, 1916. The new act embraces the most advanced measure of forestry legislation yet introduced in the Commonwealth of Australia, so that it is now made possible to create and maintain a progressive, consistent and suitable system of forest management.

By the provisions of this act a new policy was framed for the allocation of the duties of the respective commissioners, systematizing the methods of control to be exercised by them. As an outcome of this, it became necessary to construct machinery for the performance of the wide and important functions imposed upon the commissioners, including the training of officers, the demarcation and survey of forests, research work, commercial development, including the conversion and sale of wood; the introduction of system in administrative methods and business management. So far as circumstances and financial limitations have permitted, this scheme is now in operation.

A report upon the period of transition between July and October, 1916, when forestry was dealt with as a branch administration of the Department of Lands, and November, 1916, to June, 1917, when the business was transferred to the control of the Forestry Commission appointed under the Act of 1916, has been issued recently under the supervision of the Chief Commissioner for Forests, Mr. R. Dalrymple Hay.

The initial steps taken during the period covered by the report, toward the inauguration of the new admin-

istration in conformity with the Forest Policy may be briefly stated as follows:

1. The preparation of regulations under the new act. These were framed by the commission, and having been approved by the Executive Council, were gazetted to take effect from August 1, 1917. In a general way, these regulations outline the administrative scheme, and, in detail, direct the procedure.

2. The organization and training of a staff to undertake forest survey as a preliminary to the laying down of forest working plans. A number of trained surveyors are still engaged in this work.

3. The selection of a site for the forest training school, the design and erection of suitable buildings, and the selection of a principal for the school.

4. The initiation of research for the investigation of the pulping qualities of woods, for ascertaining their value for manurial potash, and for ascertaining by destructive distillation their value for the production of various by-products.

5. The creation of a commercial department was inaugurated by the purchase of two saw mills, which are now being worked satisfactorily as an industrial undertaking upon strictly business lines. Arrangements have been entered into with various government departments for the supply from these mills of sawn, hewn, and round timber, required for various public works.

6. The partial reorganization of the administrative arrangements, as far as funds allowed, has been affected including the establishment of an accounts branch with necessary staff and the appointment of a leasing officer to administer tenures which have already been, or in future may be, granted in connection with state forests. To provide consistency in the administration generally throughout the forests service, a comprehensive manual

has been compiled and circulated for the instruction and direction of all concerned.

The timber industry, in common with others, has of course been seriously affected by the world war, the consequent disorganization of markets, and the restrictions of overseas shipping. It is therefore in natural sequence to these conditions that forest activities should have declined in volume and value, and forest revenues decreased. In the same connection, the efficiency of the Forest Service has been materially reduced by the enlistment for active service of a large proportion of the trained staff. Despite all obstacles, however, the new scheme of forestry may be said to have been fairly launched, and with every promise for progress; and there is already undoubted evidence that the introduction and operation of the new policy, with its measure of independent control, must prove of value to the State. Systematization and stability which were impossible under the ruling conditions prior to the Forestry Act of 1916, make it probable that when activity in the timber industry is resumed and accelerated, as it must be after the war, the Australian forests will be more fitted to meet the expected enormous demand which will arise from the re-establishment of domestic and industrial conditions.

The business of the Commission now in hand, includes the following undertakings connected with the industrial side of forestry, which do not usually come within the scope of forest practice, viz: (a) Timber inspection; (b) Direct conversion and sale of forest products; (c) Sawmilling and timber supply, and (d) Utilization of prison labor.

A branch for the inspection, grading, and certification of timber by the Government has been in existence for many years, and is recognized as an essential in the timber industry, for the convenience of trade, and the satisfaction of timber purchasers.

In the regenerative treatment of forests, the practice has been adopted of converting any marketable wood in the areas under treatment, and in this way much waste and low-value timber is being utilized with profit. The business of direct conversion and sale of products is one that promises to extend considerably in the practice of state forestry. The business of saw-milling and timber supply is a recent development, rendered possible by the wider scope of the Act of 1916. Its primary aim is the supply of timber for Government purposes.

With regard to the utilization of prison labor, this scheme combines forestry with the work of reform; prison labor being employed on clearing and planting work near Tuncurry on the north coast.

A salient feature of the new forestry policy has been the training and specializing of the staff. Three licensed surveyors and one forest officer were trained in the methods of forest survey and assessment work. A graduate in engineering, of Sydney University, was added to the staff of the commission, to acquire experience in the forest system and to organize and build up the science of engineering as it applies to the opening up and development of the forests. One forest officer

was given a short course in the methods of afforestation and nursery practice. Three overseers were appointed for training in the duties of state forest supervision.

The Strickland state forest, which is to be attached to the Forest Training School at Narora, New South Wales, has been organized as a medium for the training of forest students. A commencement has been made in the research work in connection with forest products and by-products. Samples of wood have been submitted to laboratory tests to ascertain their cellulose and pulping qualities and arrangements have been made for destructive distillation of the principal native woods on a commercial scale, in order to ascertain the quantity and value of the by-products obtainable from them. This line of research will have an important bearing upon the problem of the utilization of waste, and upon the future of Australian forestry.

ENTHUSIASM FOR MEMORIAL TREES

IN ALL parts of the country popular interest is manifested in the American Forestry Association's plan for memorial trees to soldier and sailor dead and in the Association's similar plan for the planting of trees as memorials to Colonel Roosevelt. Reports of constantly increasing enthusiasm reach Washington by every mail. Probably no memorial project growing out of the European war has met with such spontaneous approval.

Special interest attaches to the activity of the Boy Scouts of America in planning tree memorials to Colonel Roosevelt. A million pine trees will be set out in the Interstate Park by the Scouts of New York City. Several troops of Manhattan Borough Scouts are endeavoring to have a grove of trees planted in Central Park to represent the formation of a troop of scouts in the regulation four patrols and called the Roosevelt Scout Shelter.

Special Roosevelt Scout services will be held in Philadelphia on April 5th, following which each troop will plant a tree. Columbus Scouts will plant Roosevelt Grove on the State House grounds in the center of the city. The Boy Scouts in Everett, Washington, are to plant trees on the highway from Skagit to King Lines in honor of the soldier and sailor dead, and they now ask that trees be included for their chief scout citizen. Chicago is planning for a fitting memorial in the forest preserve and the scouts are eagerly working on the plan. In Syracuse, New York, the scouts will plant a number of "Roosevelt elms" in each of the city parks. Boy Scouts in Rochester have put it up to the park commissioner to designate the kind of trees to be planted and their location in the city parks. A row of Roosevelt trees will be planted in Marion, Indiana, and the Boy Scouts will carry out a public ceremony at the time of planting.

PLANT MEMORIAL TREES

ROADSIDE PLANTING AS A MEMORIAL TO OUR SOLDIERS AND SAILORS

BY PROF. R. B. FAXON

WITH the interest that is being shown over the entire country at the present time regarding the planting of trees along our highways and through many of the cities, towns, and villages to serve as memorials to our soldiers and sailors, it is interesting to note that New York State has definitely under way a plan whereby the unit of the State Highway running from Syracuse to Utica is to be completely developed and the planting so marked with suitable tablets to commemorate the brave deeds of the soldiers and sailors in New York State. This unit of the highway is approximately sixty miles in length and offers exceptional opportunities not only to serve as a most fitting memorial for the State's sons, but also to act

whereby this initial demonstration planting may be put into immediate effect, but that a further appropriation be made for the carrying out of similar projects throughout various counties of the State. It is felt that no object could express more fully the respect and admiration held for these men than that of tree planting along the State Highway, for in the years that will come, each succeeding year will add to their glory and charm. Co-operation with other State bodies such as the Sons and Daughters



A SECTION OF COUNTRYSIDE WELL ADAPTED FOR TREE PLANTING

A NATIVE PLANTING ON A BEAUTIFUL CURVE OF ROAD

of the American Revolution is to be sought and it is hoped that New York State may find a worthy pride in its achievements along this line.

The matter of roadside planting, or as may be termed, the utilization of

as a demonstration planting for other sections of the State interested in this work.

The New York State College of Forestry, under its State-wide Extension Service, has co-operated with the New York State Motor Federation in the construction of this plan and at the present time the preliminary survey of this section of the highway is fully completed. It is planned during the coming year that not only the final planting plan is to be made available, but that active work in planting may be started. A bill recommending the planting along the State highways is soon to be placed before the State Legislature where it is hoped that not only a sufficient appropriation will be made available

our roadside areas, has been given considerable momentum during the past five or ten years, and should with this added incentive of serving as a memorial planting be brought to a point within the early future, when we may look for more definite results.

There are many elements which enter into considerable prominence and importance in the matter of roadside planting and these should be given consideration if the greatest amount of benefit is to be secured from such plantings. It must first be recognized that tree planting along our improved highways, if properly done and maintained, will be of considerable practical value aside from that of ornamentation. That such trees can be of great

service in affording an added protection to the pavement by means of their shade, is acknowledged by many authorities when through the long hot summer months the roadway is subject to an intense heat, causing the pavement to dry out, and producing a large amount of dust. Each particle of dust thus blown away shortens the life of the highway to that extent. Trees can, in some instances be of service in keeping the drifting snow off the road side along the more open stretches of highway through the winter season. In many cases where rows of well established trees have been found growing along the edge of a field, no depreciation in the value of the adjacent land was noticed in its use for crop purposes. In some cases where trees such as the Oriental Plane and American Elm have grown into immense specimens the land adjoining the trees for a distance of a rod or two has possibly been made less valuable for crop production, though the added value which such trees afford the entire field in the way of shelter from strong winds usually outweighs the loss of this small area for crop production. Many unsightly and barren strips composed of gravelly soil are found along

certain sections of our highways and on such areas it is usually found that little or no tree shrub growth is present on account of the very sterile condition of the soil. In such cases fertile soil must be brought in if we are to secure worth while results in our plantings. Embankments of varying size are also found along many of our highways and though in some instances a natural growth of native material such as sumac, birch, pine, etc., has completely covered these areas, in many places such embankments have been found in a very barren condition and it will take several years before they will be covered by native growth. In such instances artificial reforestation will be most satisfactory.

In arrangement of plantations especial care should be exercised in retaining and enhancing all desirable views from the roadside. In many places most charming vistas may be secured by a slight cutting through the underbrush, and in other instances plantings will be



Photograph by Underwood and Underwood

AN AVENUE OF STATELY EVERGREENS IN BRITISH COLUMBIA

The planting of such trees as memorials to our soldier and sailor dead is advocated by the American Forestry Association. Surely there could be no finer tribute to keep fresh the memory of their heroic deeds. This beautiful spot is on the road to Emerald Lane—a line of evergreens one mile in length with a snow peak at each end, connecting Snow Peak Avenue and Emerald Lane.

needed to break up the longer stretches of views found along the roads and by an opening here and there create desirable views along various parts of the roadside. It is often found desirable to bring ones interest into the

roadway itself, due to objectional features found along the highway or where the country is such as to be most monotonous in its character. In such instances heavy mass plantings of the trees or shrubs can be utilized on

willow may be planted to advantage, as such trees never reach a size which will interfere with the overhead wires. In other instances it has been found possible to so train the large growing species that their crowns may grow above the wires. Where tree planting is found impractical due to these conditions, it is always possible to mass in large clumps of shrub material, preferably of stock indigenous to the surrounding region. That we have such an obstacle before us should however not tend to



BARE AND UNSIGHTLY WITHOUT TREES

A splendid argument in favor of tree planting along our highways.

either side of the highway cutting the view from the roadside, thus making the element of the picture the roadway itself.

An obstacle in our tree planting work which must be given due consideration in that along practically every main highway we are confronted with many overhead wires. That these are necessary is duly recognized and it no doubt will be many years before we can expect any adequate system of underground wiring throughout the countryside. In many places where this problem must be solved, trees such as the dogwood, hawthorne, sumac, and



AN ATTRACTIVE BIT OF ROAD

Native sumach is used for this planting.

stop our efforts for more and better tree planting in such places.

The ultimate width of the improved highway is also a present-day problem, for it is realized that in many places where such improved roadways today are only fifteen to twenty feet in width, eventually with the greater



A SPLENDID EXAMPLE OF ROADSIDE PLANTING

These beautiful trees grow well above the overhead wires, which are sometimes quite hard to dispense with in the country.

use of motor vehicles a demand for a roadway of not less than thirty feet wide will be made. All planting work to be considered should be done so as to allow a pavement of this minimum width on all main highways and where the present roadway is not sufficiently wide to permit of any planting, immediate steps should be taken to secure additional land to be placed under the control of the State Highway Commission.

In many ways the maintenance of the tree planting is of greater importance than that of the planting itself. Ample provision should be made for the control of insect attack so prevalent in many sections of our most beautiful countryside, whether such work be under the control of the State, County, or Municipality. The matter of pruning and thinning of such planting should be amply provided for especially where the wire obstacle is at all serious so that when necessary cuttings are made they may be done under the direct supervision of a trained forester rather than by the usual ax and saw of the lineman whose only interest is in the question of good wiring.

We are most fortunate in the wide range of planting material from which to select for general roadside plant-

ing. It is usually found that no such limitations as are found in practically every city, town, or village, in the way of narrow streets and of buildings in close proximity to the street, need come into consideration in selecting our planting stock. The American Elm and the Sugar Maple have been planted through the Eastern part of the country greatly in excess of other varieties and where the Elm Leaf Beetle and other insects attacking the elm are not found, the continued use of this variety is recommended along the wider highways, for no other tree can add more to the dignity and charm of the roadside than this variety. The Norway Maple can and should be substituted for the Sugar Maple where the Maple Borer is present in any one region, as this does not attack the Norway variety. This tree grows into very symmetrical form and is coming into universal favor for both road-

side and town planting. In many respects the Oriental Plane is worthy of greater use where the winter conditions allow this variety to be planted. Various species of Walnut and Hickory are also recommended. In fact, many varieties of trees can be enumerated as being well adapted for roadside planting, though aside from the varieties mentioned above, those which should be brought into greater prominence are the Scarlet Oak, Pin Oak, White Ash, Horse Chestnut, Willows in variety, Hackberry, and Dogwood. For the secondary or shrub plantings it will be found in most cases that large masses of native material is desirable. If each state in making such plantings might be held in its selection to plants indigenous to its own particular locality, the effect would be most delightful and such plantations should grow luxuriantly under a favorable environment. Such shrubs

as the Grey Dogwood, the Viburnums in variety, High-bush Huckleberry, Elders and Alders are typical of the native material found along many of the Eastern highways aside from the states so fortunate as to include in their list the charming Mountain Laurel. The native roses are also highly desirable for



A SHADY SPOT

Shade cast upon the roadside during hot summer days when travel is extremely heavy, aids greatly in making the highway more durable.

large mass plantings and their effect upon the roadside during the early spring is most pleasing.

That we have neglected the use of the conifers, especially the pine and spruces, in our roadside work is known to us all. Now that such plantings are to be carried out and demonstration plantings are being made which will, in a sense, serve as model plantings, we should most certainly include the conifers whenever possible and practical in our planting list. Long rows of pinés along the roadside growing luxuriantly and perfectly at home in their surrounding have much to recommend themselves for greater use. A most delightful contrast is also secured by mixing the deciduous trees and shrubs with the conifers, thereby adding to the general effect of the roadside either in summer or in winter a warmth and charm pleasing to all.

The Welfare Committee for Lumbermen and Foresters in War Service has been notified of the arrival at Hoboken, February 12th, on the U. S. S. North Carolina, of the 12th Battalion, 20th Engineers (Forest). Also the 32nd Company, 11th Battalion, 18 officers and 850 men. They will remain at Camp Mills several days prior to their demobilization. These battalions were formerly of the 1st and 2nd Companies, 10th Engineers (Forest).

FEBRUARY---AND PLANT-LIFE STILL SLEEPS IN NORTHERN CLIMES

BY R. W. SHUFELDT, M. D., R. A. O. U., ETC.

(Photographs by the Author)

THROUGHOUT New England—indeed often throughout the entire State of New York—typical winter weather usually prevails during the entire month of February, with plenty of snow and ice everywhere. Rarely is the reverse the case; while, as we proceed southward and pass below the mid-tier of Atlantic States, the woods, the fields, the streams—one and all—appear very much as we see them in early spring still farther South. In eastern Virginia, for example, the meadows may remain green during some winters; and while most trees will have, many weeks before,

parted with their leaves, yet, here and there a few dandelions, and perhaps other flowers, have bloomed all through this month, in situations sheltered from the more searching winds of winter. It is needless to say that, as we proceed still further southward, for example into that land of flowers, Florida, the sequence of growing vegetation is perpetual.

To return northward again, however, we may, on one of our tramps along some roadside, meet with a Bittersweet vine (*Solanum dulcamara*), which, though it has lost most of its leaves, nevertheless has remaining



THIS IS AN AUTUMN SCENE AT THE NATION'S CAPITAL

Fig. 1—The waterfall at Pierce's Mill, in beautiful Rock Creek Park, Washington, D. C.

upon it bunches of its beautiful, bright red, ovoid berries—the latter having been overlooked by the birds that are fond of them, and are now in evidence of the plant's hardiness; these berries are of a rich dark green. In turning, they first become a fine yellow, passing to a deep orange, and finally to the brilliant scarlet noted above.



BITTERSWEET BELONGS TO THE NIGHTSHADE FAMILY (*Solanaceae*); RANK-SCENTED VINES, THE FRUIT OF WHICH IS OFTEN SAID TO BE EXTREMELY POISONOUS

Fig. 2—Linnaeus designated this vine as *Solanum dulcamara*; its elegant, red, ovoid berries are well known to us in the autumn.

This vine is also known by the common names of snake or scarlet berry; blue bindweed; nightshade; poison flower, and perhaps others. It would appear that the reputation it once bore of being "deadly poisonous" has, long ago, been exploded—surely none of its near relatives are, among which may be numbered the eggplant of our gardens, as well as the tomato and potato. In Figure 2 are well shown some of its graceful purple flowers, with their pointed, yellow centers. Often a few of these are found in good shape on the vine at the same time when the bunches of berries have assumed their gorgeous scarlet skins. Note the curious form of the leaves of this vine, with the little winglets near the base of each. Often we find this vine growing on our fences, or even upon some support or other in our backyards. Professor Gray states that the derivation of the name *Solanum* is not known, which, of course, applies to the

scientific name of the entire Nightshade family—the *Solanaceae*; while others claim that it is derived from *solamen*, consolation, solace, and so on, which has reference to the narcotic properties afforded by a number of the tropical relatives of this vine; and the genus is one containing an enormous number of species. The specific name appears, without doubt, to be derived from *dulcis*, sweet, and *amaras*, sour or bitter; for the juice of the vine most assuredly produces the double impression upon our sense of taste.

The common garden Nightshade or Morel bears black berries, the poisonous qualities of which have not been fully disproved. Perhaps it is just as well not to test this by chewing them and swallowing the juice. This vine is the *Solanum nigrum* of the botanics, and it is well-nigh cosmopolitan in its distribution. Its flowers are white. We have another vine we call "bittersweet," and it may be known in the autumn by its gorgeous



THE ASTERS OF THE *Compositae* CONSTITUTE A VERY NUMEROUS, NOT TO SAY PUZZLING GROUP OR GENUS TO STUDY. THEY HYBRIDIZE FREELY; BUT THERE APPEAR TO BE UPWARDS OF AN HUNDRED GOOD SPECIES OF THEM IN THE ATLANTIC STATES ALONE

Fig. 7—This is the common Purple Aster (*Aster patens*), also called the Purple Daisy. The caterpillar is the one the children call the "black bear." There is a triple-banded one like it—deep chestnut and black. They are the first species of larvae of this kind making their appearance in the spring.

yellow berries, which, when bursting open, have elegant scarlet seeds. A bunch of these is very decorative in a vase indoors, and their lasting properties are truly wonderful.

During this month of February, we will find that many plants have gone to seed, and a very interesting one among these is the Angle-pod, here shown in Fig-



SOME OF THE CLOSE RELATIVES OF THE MILKWEEDS ARE CLIMBING VINES, GROWING IN WET PLACES. THIS ONE, *Gonolobus laevis*, BELONGS RIGHT IN THAT FAMILY.

Fig. 3—Angle-pod is the common name for this vine, the seeds of which are tufted as we find them in the true milkweeds (*Asclepias*).



SOME INTERESTING PLANTS ARE FOUND IN THE CROWFOOT FAMILY (*Ranunculaceae*), AND THE THIMBLEWEED OR TALL ANEMONE IS ONE OF THEM (*Anemone virginiana*).

Fig. 5—When this species of Thimble-weed goes to seed, its fruit-heads remind one of common, medium sized thimbles, as they are represented here in this cut.

ure 3. In dense thickets, along the banks of sluggish rivers and canals, it flourishes from Pennsylvania, westward to Illinois, and southward through Kansas to the Gulf. Although a "perennial twining herb, smooth, with opposite, heart-ovate and pointed, long-petioled leaves, with small flowers in raceme-like clusters on slender axillary peduncles" (Gray), it nevertheless has a seed-pod almost exactly like the one borne in the autumn on some of our species of milkweeds. When we open one of these pods, we find the tufted seeds, arranged almost exactly as they are in the pods of some of the slender-pod *Asclepias* of the Milkweed family (*Asclepiadaceae*). The vine has been called Angle-pod from its angled fruit, the name being derived from two Greek words meaning an angle and a pod.

The vine and its pod is of a specimen found growing on the banks of the Georgetown Canal, a little more than a mile west of Washington. Some day we will show what the flowers look like, when a clearer idea may be obtained of their milkweed affinities.

Some plants are especially beautiful and attractive when they go to seed, and they may retain this state throughout the entire winter. Among these we have in mind the common Daisy Fleabane (Fig. 4), an abundant roadside species in the region where it flourishes. These Fleabanes are closely related to the Asters of the *Compositae*, and the group contains such well-known flowering plants as the Horseweed (*E. canadensis*) and Robin's Plantain (*E. pulchellus*). The name is composed of two Greek words meaning "spring" and "an old man," referring to the hairiness of the stems when the plants are in flower,—that is, hairy in the *spring* time,—one of the *Senecio* names. Gray also gives *Eucrigeron*.

Referring to two of the Fleabanes, a popular writer at hand says: "That either of these plants, or the pinkish, small-flowered, strong-scented Salt-marsh Fleabane (*Pulchea camphorata*), drive away fleas, is believed only by those who have not used them dried, reduced to powder, and sprinkled in kennels, from which, however, they have been known to drive away dogs."

In these February days, in the woods and fields from Maine to South Carolina,



WHEN THE DAISY FLEABANE GOES TO SEED, ITS TUFTED FRUIT-FLUFFY BALLS OF A RICH TAN—CONSTITUTE ONE OF THE ATTRACTIONS OF THE LANES AND ROADSIDES.

Fig. 4—*Erigeron annuus* of the great Composite family (*Compositae*), may be easily recognized by its hairy stem and the little leaf in the angle of its branching stems.



ALONG STREAMS AND BORDERS OF SWAMPS AND MARSHES IN NOVEMBER, THE WELL-KNOWN SHRUB WE CALL SPECKLED OR HOARY ALDER APPEARS AS SHOWN IN THIS CUT.

Fig. 6—Alders belong to the Birch family (*Betulaceae*), the species here shown being the *Alnus incana* of the botanists.



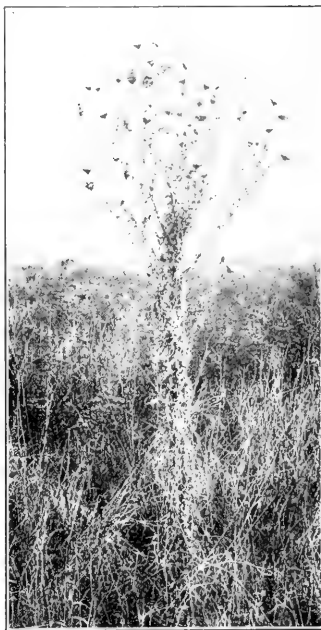
WILD GARLIC IS USUALLY FOUND GROWING IN WET MEADOWS, OR ALONG THE SHORES OF BAYS AND RIVERS. ALL ALONG THE ATLANTIC COAST LINE, WITH OTHER SPECIES, THEY BELONG TO THE LILY FAMILY.

Fig. 8—Numerous species of Wild Onions or Garlic (*Allium*) occur in our eastern flora. This is *Allium canadense*, the specific name being the old Latin one for garlic.

Greek and Latin derivation, "a corruption of *Naman*, the Semitic name for *Adonis*, from whose blood the crimson-flowered *Anemone* of the Orient is said to have sprung."

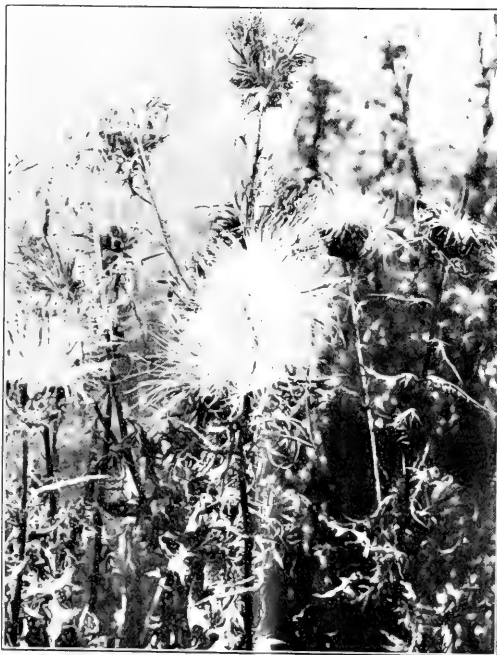
Sometimes we find the seeded Thimble-weed heads sticking up above the snow in the middle of the winter, or even when the snow is melting in the early spring. During this part of the year, too, the alder bushes along our streams and borders of our marshlands appear as they are here illustrated in Figure 6. This is the common or Speckled Alder, also called the Hoary Alder (*Alnus incana*). Commonly it is a shrub, while on the other hand some specimens may grow to become so tall and big as to really demand being relegated to the tree class. The

we often meet with the Thimble-weed, the plant having gone to seed at this season. (Fig. 5.) Many of us know it as the common tall anemone of the waste places, roadsides and brakes along the margins of the woods. Mathews says: "The flowers generally have five inconspicuous sepals, white or greenish white inside and greener outside; the flower-head, usually one inch or less across, is succeeded by the enlarged fruit-head similar in shape to and about as large as a good-sized thimble." Honeybees and bumblebees are the insects chiefly responsible for the fertilization of the Thimble-weed's flowers; but they are assisted in this by some very brilliant little flies (*Syrphidae*), which one may easily detect by watching the flowers when they bloom, about the middle of June and later to include August. We have a pretty long list of anemones in our flora, and they are all regarded with great affection by those who love the woods and fields. Our revered Professor Gray tells us that the name *Anemone* is of ancient



FREQUENTLY WE MEET WITH EXAMPLES OF THE TALL THISTLE (*Cirsium altissimum*) THAT HAVE GROWN TO BECOME TEN FEET IN HEIGHT. HERE IS A MARYLAND SPECIMEN THAT WAS FULLY THAT TALL.

Fig. 9—Thistles, of which we have a great many species, belong to the *Compositae*. In their relations they stand next to the much smaller genus of Burdocks' (*Arcium*), the flowers of which have a thistle-like appearance.



THISTLES GROW SO CLOSE TOGETHER SOMETIMES, THAT ONE CANNOT PASS AMONG THEM EXCEPT AT THE RISK OF MANY PAINFUL PUNCTURES FROM THEIR STRONG SPINES.

Fig. 10—This is a late autumn or early winter group of common thistles; and we cannot but admire their fruiting even though the plant offends in all other particulars.

one in the cut—that is its twigs—were taken from a "shrub" fully ten feet in height. It is well known in the dendroflora of many parts of Europe, and the ancient Latins bestowed the name of *Alnus* upon it. We have several species of these alders in our country, as the Smooth Alder (*A. rugosa*), the Black Alder (*A. vulgaris*)—which is a tree sure enough—and the Seaside Alder, which is likewise a small tree. This last species is only found in Delaware and Maryland, not far from the Atlantic coast-line; it has also been discovered in Oklahoma (*A. maritima*). Then there is the Green or Mountain Alder (*A. crispa*) and the Downy Green, the *Alnus mollis*.

Newhall says of the alders that they bear "*staminate flowers*, in long, drooping clusters, with three (sometimes six) blossoms, and four or five small bracts to each shield-shaped scale. *Pistillate flowers*, in oval or oblong clusters, with two or three blossoms to each fleshy scale. *Scales or bracts*, woody in fruit." Further on: "*Fruit*, in 'cones,' sometimes winged, scale-like, cluster. A scale-like nut." These woody scales and bracts in threes and the "cones" are shown in Figure 6 of the present article.

There are over sixty different kinds of asters in the native flora of the northern and middle Atlantic tier of States, and some of them support almost perfect flowers far into the late autumn; indeed, a great many of them, even the northern varieties, do not begin to bloom until October or early November. (Figure 7.) This is the reason some people have bestowed the name of "Frost-flower" upon them in the North, while further South they are known as "Starworts." As we know, the rays of many of the species are of a rich purple; but then there are other species in which they may be white, blue, or even pink. In the case of the "disk," it is usually yellow, but later on this may change to purple. Botanists have long been familiar with the fact that these asters are quite prone to hybridize; and, as a consequence, the limits between any two species is frequently but poorly defined. Asters stand about in the middle of the Composite family (*Compositae*), and are quite typical of this enormous group of flowers; in fact, it is our largest family of phanogamous plants, or plants that have flowers developing both pistils and stamens, and, in fruiting, produce seed. Asters, like the daisies and black-

eyed Susans, fall in the ray-flower group of the *Compositae*—so called from the fact that the corolla is made up of radiating "petals" springing from the periphery of a central disk, which latter is composed of the true flowers; these are very small and tubular. By examining a daisy or an aster with a good hand lens, much of this will be revealed to you.

We speak of the corolla of an aster as being "strap-shaped" (*ligulate*), while in many other kinds of the *Compositae* it is tubular, as in the case of the flowers of the Ironweed (*Vernonia*). The Aster in Figure 7 of this article clearly exhibits all the characters mentioned. Wild Garlic (Fig. 8) is a plant that may persist far into the autumn, and it may be readily recognized—as an onion—by its small bulb with fibrous coats, closely resembling a small onion. Two of these are shown in the figure, which is a specimen collected along the Virginia banks of the Potomac River, not far from Mount Vernon. Like all the onion group, all parts of the plant are strong-scented and pungent. The long, slender, cylindrical stems spring direct—in any single plant—from the apex of the bulb, as shown in the cut, and its upper extremity supports the extraordinary appearing flower head. These last are often few in number and sometimes even absent. There are some eight or ten species of the Wild



HERE IS A MOST BEAUTIFUL AND, IN THE CASE OF THE MALE, AN ELEGANTLY COLORED LITTLE LIZARD FROM FLORIDA

Fig. 13—Wood's Swift (*Sceloporus u. woodi*), of which this is a male, has only been very recently described.

Onions, Leeks, or Wild Garlics in the northeastern United States, and they are interesting plants to study.

Of all the groups of plants in the Middle-States section of our country, none brings more home the fact that winter has—as yet—not fully made up its mind to leave us—than the Thistles. Take, for example,

the big fellow here shown in Figure 9, and note how it towers among a perfect army of different species of plants, every one of which has gone to seed several months or more ago. Nearly all the seeds of this plant have been borne away by their feathery tufts, and there is scarcely a single meal left for some solitary goldfinch that may, with his long undulating

trunk, or any of the branching portions. Flowers, seeds, pods, leaves, roots, bark—indeed any of the numerous structures of plants are subject to disease, to the attacks of parasites, to fractures or other injuries, burns and scalds, lightning strokes, strangulations, impact of foreign bodies, drowning effects of excessive solar heat, and many other liabilities. In Figure 11 we have an example of the effects of an attack on the part of some parasite on the leaves and flowers of the common wild Sunflower. In a previous number of AMERICAN FORESTRY it was



OUR SAW-WHET OWL IS A VERY ATTRACTIVE LITTLE BIRD, AND IN FEBRUARY WE MAY OCCASIONALLY MEET WITH ONE IN THE WOODS

Fig. 12—His place is among the smaller members of his family, and ornithologists call him *Cryptoglaux a. arcadica*. He sleeps nearly all day long.

dips a-wing, come that way. One naturally associates these goldfinches with the thistles-gone-to-seed—occasionally so vividly that it requires no stretch of the imagination to hear their plaintive notes, although the little black-and-yellow fellows may be nowhere near. This is especially the case when the plants are growing in masses, as they are here shown in Figure 10.

Aside from studying flowers when they are in the enjoyment of their perfect and normal condition, there is another most interesting chapter in their lives which deserves our earnest consideration and exhaustive research. Reference is made to their diseased states, or other manifestations in them indicating various departures from the healthy ones. This is a very large and very important subject, and much attention has already been paid to it by phytopathologists, or those who take into consideration the diseases of plants, shrubs, and trees.

Diseases of a great many different natures may attack any part of any vegetable growth—as the stem, the



SOME PLANTS ARE PARTICULAR VICTIMS OF PARASITIC GROWTHS; HERE WE HAVE SOME VERY REMARKABLE ONES ON THE WILD SUNFLOWER (*Helianthus decapetalus*)

Fig. 11—These big bulbs are caused by the sting of an insect, the larvae of which we may find by cutting one of them open. The flower is frequently included in the pathologic growth, as may be noted here.

shown how oak-galls were produced through the attack of certain species of insects, and what an important industry resulted from ascertaining the value to man of these products.

February, especially in the more northern States, is the month when the owls make themselves heard in the land.

The nights are cold; the moon shines with a peculiar brilliancy, and we are liable to have a snow-storm or two. It is then that we hear the familiar notes of the owls, either late of an evening or during the early morning hours. Of these, perhaps the notes of the Screech Owl are most often heard, and next to this species, maybe, the Great Horned Owl. Once in a while, however, come the curious notes of our little Saw-whet Owl (*C. a. arcadica*), although this bird may most often be heard during the daytime. The notes so closely resemble the filing of a saw, that the bird, long years ago, received its vernacular name from that fact. This cute little owl—one of the pygmies of the group—has the habit, during the daytime, of sitting out in plain sight and falling fast asleep. He may choose the top twig of some isolated bush in an open field, or the dead, projecting limb of a tree occupying a similar situation. His appearance on such occasions is well shown in Figure 12 of the present article. This little owl has frequently been made captive and kept as a pet; but it is the exception to have it thrive under such conditions. It seems to demand considerable exercise and the same kind of food it secures in nature.

Passing from owls to lizards, it is an interesting fact to note that, old as our country is in point of settlement, we still meet with undescribed species of animals, even in the long-settled districts. This was the case with the very beautiful little lizard here published for the first time in Figure 13. The specimen was received by the writer alive from Haines City, Florida, sent him by Mr. R. H. Young, a member of the American Forestry Association, who had secured it near his home. Several others of the same species accompanied it, both dead and

living ones, as well as others in spirits. Both sexes were represented, the males being much the handsomer, with their sides striped with jet black, and the under parts—throat and middle sides—of a brilliant blue, bordered with the same intense black.

The writer was about to describe this lizard as new, when it was discovered that one of the curators of the National Museum had a description of it up in type and about to appear. It belongs to the lizards we call "Swifts" in the vernacular, and *Sceloporus* in technical science. This one received the name of *S. u. woodi*, being named for Mr. Nelson R. Wood. Mr. Young describes it as one of the swiftest of the swift, and is captured only

with the greatest difficulty. It is a perfectly harmless little fellow, and subsists chiefly upon insects of various species.

We have a good many species and subspecies of these swifts in various parts of the United States, this being one of the smaller forms. Others are considerably larger, perhaps three or four times as large. They are perfectly harmless little creatures and are frequently kept as pets. We have no venomous lizards in our reptilian fauna, although very many people regard with distrust and sus-



THIS IS A MOST UNUSUAL IF NOT UNIQUE PICTURE, TAKEN IN SITU, OF THE HARLEQUIN MILKWEED CATERPILLAR

Fig. 14—Drury gave the moth of this insect its scientific name, which is *Euchaetia egle*.

picion the famous "Gila Monster" or *Heloderma*.

The interesting subject presented in Figure 14 is a very unusual one, as it was taken without disturbing a single thing shown in the picture. In the lower left-hand corner is seen the white bud of the Bindweed, and above it, slightly to the right, some flowers of the Blue Boneset. Several other plants are included—among them a withered thistle. What is most interesting, however, is the central subject, the one for which this picture was taken. This consists of three pods of the common Milkweed,

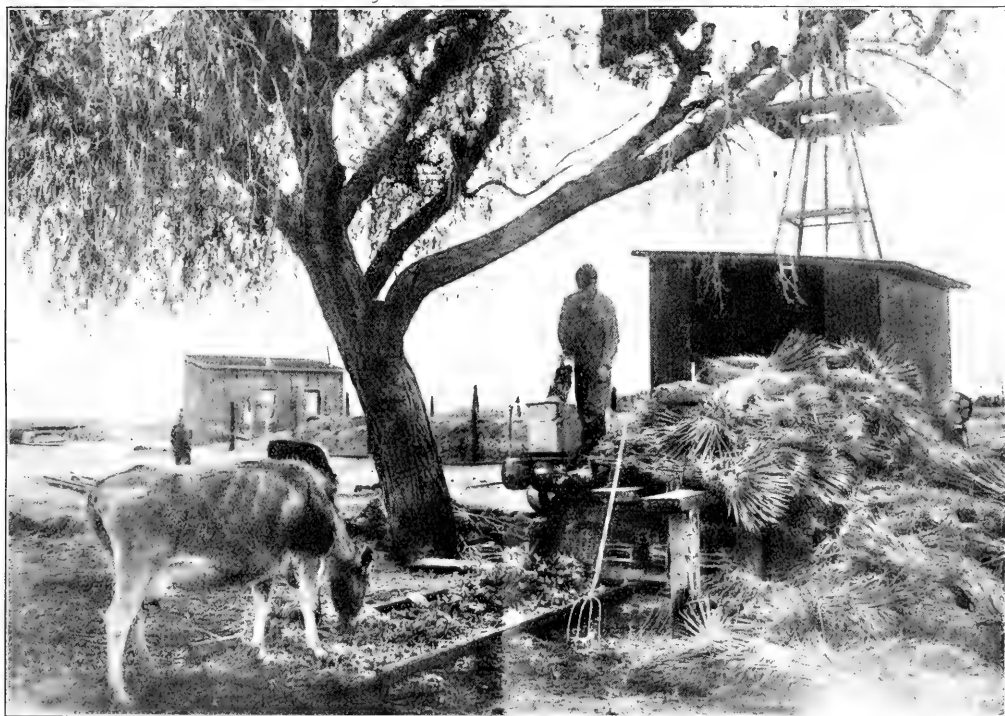
terminating the stem of one of those plants, with another pod lower down. On the central, horizontally disposed, upper pod, are six very curious-looking caterpillars; they are very hairy little creatures, the hair being regularly arranged in tufts. Where it is dark it is black, while the lighter tufts are of a buffy orange and light brown. These are the caterpillars of the Milkweed moth (*Euchaetias egles*), and they were taken natural size on a six and a half by eight and a half plate, the locality being Great Falls, southern Maryland, a few miles northwest of Washington, D. C.

This Milkweed moth is a very abundant representative of its genus, ranging throughout the Atlantic States, westward beyond the Mississippi Valley. It is a very modest-appearing little moth, with an expanse of wing measuring about four centimeters. Hampson has given us a detailed figure of it, and Holland has likewise done so in color. From the last it would appear that its wings—both pairs—are of a pale grayish brown, and there is a median row of some seven or eight fine black dots on the abdomen above. This row of dots is quite characteristic of several of the allied forms of this genus of moths.

EMERGENCY FEED FROM DESERT PLANTS

AN emergency drought-time feed for southwestern stockmen which has previously been overlooked is the desert shrub locally known as soapweed. Its scientific name is *Yucca*. While this plant is not high in nutritive value nor suitable for feed until it

meal with ground *Yucca* a fairly well balanced ration is made. By using this feed without waste in dry seasons only, a fair crop will always be available. If it is used properly and due regard given to conserving the present supply, thousands of cattle may be saved



CHOPPING AND SHREDDING YUCCA FOR CATTLE FEED

It is eagerly eaten by the cow, even though this particular milch animal was not in a starving condition, as were those which had tried to subsist solely on range vegetation.

has been properly ground, the specialists of the United States Department of Agriculture have found that in seasons of drought when range grasses and other sources of feed fail, it can be used to save cattle and sheep from starving. By the addition of a little cottonseed

during the drought season to add to the nation's meat supply.

There are a score or more species of *Yucca*. Sotol has been utilized as stock feed for some years, but only recently have soap weed and bear grass, two other forms

which grow abundantly, been utilized in this way. Both of the latter are well adapted for feed, but because the food material is found mainly in the tree-like trunk it is necessary that they be ground or chopped finely before stock can eat them.

The machines used for cutting Yucca have heavy cylinders carrying teeth or knives that rotate before a chopping block to which the plants are fed. One of the larger machines run by a 12 or 14 horsepower engine with a crew of 3 men will chop or shred about two tons of soap-weed an hour.

If fed alone, this feed may be expected to keep stock from starving; if fed with concentrates a properly balanced ration may be worked out. The customary practice among users of this feed is to give young stock six to



A TYPICAL STAND OF YUCCA, OR SOAP-WEED

This will furnish an emergency food for dry seasons when other range plants fail.

twelve pounds per day with one-half to three-fourths of a pound of cottonseed cake or meal. Mature stock are given 20 to 40 pounds and 1 to 2 pounds of the cottonseed concentrate daily. Fifteen to 25 pounds per day fed alone will save stock from dying. Practically the only cost in using this feed is in its preparation and it is estimated that when 20 pounds is fed per day this cost amounts to only 50 cents per month.

Yucca should be regarded as an emergency feed only, the specialists say. It makes a very slow growth and only two species—soap weed and bear grass—may be expected to renew themselves if cut off. The bear grass of the New Mexico-Texas plains region will produce a new crop in three or four years, while soap weed requires from ten to fifteen years.



SAVED FROM DEATH BY STARVATION

Bunch of cattle which were saved from starvation by the feeding of Yucca, or soap-weed. Some of the stock here shown were unable to get to their feet without assistance before the Yucca was fed.

GOVERNOR LOWDEN ENDORSES TREE PLANTING

THE importance of wood as building material and the necessity for conservation of trees is recognized by Gov. Frank O. Lowden of Illinois as paramount issues in the economic life of the country. He has often urged tree planting in the state.

In a recent article in the *Chicago Tribune* Governor Lowden said:

"I know of no single acre of land in Illinois, even though it be not suited to cultivation, that cannot be made to produce trees successfully. We shall, if we are wise, make laws whereby every acre, which will not

produce wheat or corn, will be made to grow trees.

"It may be that we shall be wise enough to exempt these lands from taxation, saying to the owner: 'Plant this little tract to trees and we shall tax you nothing, requiring only that when your children or your grandchildren harvest them they shall pay a fair percentage of the proceeds into the treasury of the state.'"

"You would not only set these little acres to work for the profit of both the state and the owner, but the growing forest upon the farm will help to tie the children to the farm."

THE PLOVERS

(Family Charadriidae)

BY A. A. ALLEN

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

IF TRAVEL is an education, the plovers must be a highly educated family. With their near relatives the sandpipers, they hold, with one exception, all records for long distance flights. The one exception is the Arctic tern which nests within the Arctic circle and winters within the Antarctic, traveling some ten thousand miles over the sea twice a year. When it comes to actually seeing the world, however, there is no bird to compete with the golden plover. This bird nests on the Arctic shores of North America and then flies south-east to Labrador, New Brunswick and Nova Scotia. The 2,500 miles of sea between Nova Scotia and South America hold no fears

shores. The two routes are fully 1,500 miles apart.

The western golden plovers often start from Alaska for a direct flight to the Hawaiian Islands and thence to the islands of the South Sea. The golden plovers that nest along the Arctic shores of Europe and Asia and

winter from India to South Africa, are only slightly different from the American birds and, if we include them, we may certainly claim the whole world in the range of this remarkable bird.

The golden plover is a bird somewhat smaller than a pigeon with long pointed wings. Its upper parts are spotted with golden yellow and black, and its underparts are uniformly black in summer and grayish white in winter.

A white stripe from the forehead down the side of the neck and breast is conspicuous in the summer plumage when set off against the black underparts.

Very similar to the golden plover is the black-bellied plover which has a similar change of plumage with the seasons but always lacks

the golden yellow spots of the upper parts. It is equally cosmopolitan, and, in eastern North America, at least, is a more common species. Some of them pass the winter as far north as North Carolina but others continue their



WHAT ARE THE WILD WAVES SAYING?

Here's a fine place for plover and here are a couple of ringnecks and a sanderling.



BLACK-BELLIED PLOVER IN FALL PLUMAGE

They are easily distinguished from the golden plover, which they resemble, by the black spot under the wing.

from Argentina, it crosses Central America and enters the United States by way of the Gulf of Mexico, traveling up the Mississippi Valley to Manitoba and Saskatchewan and thence to its breeding ground along the Arctic



ONE OF THE SMALLER PLOVER

The semipalmated or ring-necked plover is a miniature edition of the Killdeer, but it has only a single band across its breast.

flight to Brazil and Peru. Both species are similar in habits, frequenting shores and mud flats or even ploughed fields or pastures. They fly in close flocks and appear not unlike small ducks at a distance. Upon alighting they scatter to feed, running along the beach in search of stranded aquatic insects and crustaceans which they pick up with a vigorous tilt of the body as though they were about to dive.

Both the golden and black-bellied plovers are still numbered among the game birds and are hunted either by means of decoys or by stalking them along the shore. They have rich mellow whistles which are quite easily imitated and they may often be drawn down to the decoys from a great height by the hunters.

There are about seventy-five species of plovers in the world of which only eight, including the two mentioned, are found in North America. Of these, by all means the most common and best known is the killdeer, so called from its notes—"kill-dee, kill-dee, kill-dee"—which constantly fill the air wherever these birds occur. They seem to have petulant dispositions and find expression for their feelings through constant noise so that the slightest disturbance of alarm starts them off. The majority of shore-birds are confident creatures and unless constantly shot at, will allow even the hunters to approach closely. Not so with the killdeer; it seems to have a special aversion for man and espys one approaching at a great distance and starts "kill-deeing" so as to alarm the whole flock, and long

before the other shore-birds take wing, it pitches off on a swift, erratic flight to some distant part of the shore. Its wings are long and pointed and the speed which it develops when once under way is as remarkable as the irregular course which it often pursues.

Upon its nesting grounds, and it nests from the Gulf States to British Columbia, it is even noisier than on the shores, though in the defense of its nest it often loses much of its timidity. Indeed when its nest is approached, it will usually trail its wings on the ground and go limping off within a few feet of the intruder in an endeavor to lead him away. The easiest method of finding a killdeer's nest is always to walk in the opposite direction from that in which the bird tries to lead one, noting when it seems to show the greatest distress.

Were it not for the behavior of the killdeer, the nest would be extremely difficult to find for it consists of a mere depression in the gravel or in the soil of the garden wherein are laid four very protectively colored eggs. They are large for the size of the bird, light brownish or drab in ground color, with heavy black markings, and pointed at one end so that they will fit

together and be more easily covered by the incubating bird.

The young killdeers when first hatched are covered with grayish brown down and are even more protectively colored than the eggs so that when they crouch in the nest, they are almost impossible to see. The accompanying photograph of a nest containing three young and one egg will illustrate this point. They are active little creatures and can run about and even swim, shortly after hatching. At the slightest alarm, however, a note from

their
parents
tell them



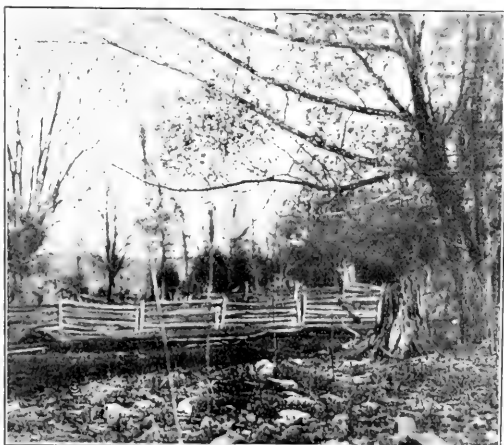
to crouch and they remain immovable until the old birds tell them that danger is past and that they can once more run about.

As soon as the young are able to fly, various families gather into flocks



SEEMS LARGER THAN IT REALLY IS

Because of its long wings, the killdeer appears much larger, when on the wing, than it really is.



THE HOME OF THE KILLDEER

Creek bottoms, pastures and cultivated lands are the nesting place of this bird. The black bands across the breast and the white neck ring break up its contour and make the bird in this photograph difficult to see.



A KILLDEER BROODING

The young birds can be seen crowding beneath the wing of the old bird.

and, if the season is dry, make for the shores and mud flats. If it is a rainy season, however, they may be found far from water until late in the fall. Some killdeers remain as far north as New Jersey for the winter but others migrate southward as far as Venezuela and Peru.

Before the passage of the Federal Migratory Bird Law, the killdeer was on the game list and their tiny bodies graced the table of many a "pot hunter." The majority

smaller. Another difference is that the killdeer has two black bands across its breast while the rest have but one. Another distinctive mark of the killdeer is the rufous patch above the tail. The conspicuous white ring around the neck is shared by all but the plain colored



HIS FIRST SWIM

Young Killdeers can run and even swim very soon after hatching and follow their parents about instead of staying in the nest.

mountain plover of the high arid plains of the West.

The best known of the remaining plovers is the semipalmated or ring-necked plover which breeds in northern North America and spends the winter anywhere from the Gulf States to Patagonia. It seems to prefer sandy beaches to the mud flats and is common during May and again in August and September all along the coast and the shores of inland lakes. Like the killdeer it



STANDING GUARD

Note how protectively colored are both the old and young killdeers in spite of their conspicuous marks.

of sportsmen, however, though attracted by their swift flight and apparent size, have always been willing, after once discovering the size of their bodies, to leave them in peace. Today all realize that their value about cultivated fields and pastures during the summer in, destroying grasshoppers and other pests, more than equals their slight value as food and are glad to see them given a much deserved protection.

The remaining North American plovers are somewhat similar to the killdeer in general appearance but are



JUST OUT

A young Killdeer only a few hours old but already far from home.

appears much larger on the wing than it really is and during the years that it was considered a game bird, even the most callous "game hogs" could not but feel a tinge of regret when they felt the tiny bodies of their

victims. It has a clear cool note of two syllables which is always given when it takes wing and further adds to its charm.

The Wilson's plover of our southern coasts is a very

toes than the sandpipers with which they usually associate. Their bills are likewise much shorter and are slightly swollen at the tip being suggestive of those of pigeons with which birds, indeed, they are supposed to have much in common.

NEW YORK FORESTRY AND RECONSTRUCTION

IN AN address before the annual meeting of the New York State Forestry Association held in the Educational Building in Albany, on January 21st, Dr. Hugh P. Baker of the State College of Forestry at Syracuse, who has just returned to his work in the College after sixteen months as an officer in the regular infantry, described the effects of the war upon the forests of the world and discussed the important problem of the development of a land policy for New York and the relation of the forests to water conservation. He emphasized the fact that the period of reconstruction will be the day of the technical man, speaking as follows:

"The turning of nearly every industry in the country from the beaten path of pre-war years into war channels through which was poured unending shiploads of war supplies onto the shores of France, has demonstrated clearly the idea that the time of reconstruction in this country and the period of prosperity which seems to promise to follow reconstruction will be the day of the technical man."

In describing the effect of the war in Northern France, Dr. Baker stated that for the two years ending December, 1918, the total requirements of the Associated Governments were approximately 600 million cubic feet of saw log timber; three quarters of which by volume had to be large sized material. This tremendous demand upon the French forests had to come from a greatly decreased forest area since over 1,230,000 acres of forest land was in the territory occupied by the Germans. The loss of this acreage of forest land meant to France an annual loss of approximately 17½ million cubic feet of saw log timber. The drain upon the French forests for the past four years is estimated to be equivalent to the growth of twenty years. In other words, the growth that would have taken place in the next twenty years in the French forests has already been used. It was shown further that the forest areas of practically every other European country, excepting Russia, have been seriously depleted and that lumber for the rebuilding of the devastated portions of France and Belgium must come from America, as the disorganized condition of Russia will probably not allow that country to come into the world lumber trade for years to come.

In emphasizing the place of the forester in assisting the State of New York in solving its land and water problems, Dr. Baker emphasized the necessity of having a clear understanding of just what forestry means. As agriculture means not alone the growing of a crop of grain but the production of food and draft animals, and the manufacture of the crude products, as in the dairy industry, and finally the marketing of the product, so forestry has been as broadly defined in the 200 years of its application to European forests.



NEST AND EGGS OF THE KILLDEER

The eggs are large for the size of the bird and very protectively colored. They are pointed at one end and ordinarily fit together like the segments of a pie. Here one of the eggs has been disarranged by the bird's hasty departure. The nest is a mere depression in the gravel.

similar bird but is somewhat larger. The piping plover is a much paler bird and does not have the pronounced breast band of the ring-necked species. It is nowhere a common bird but is found in summer locally from



CAN YOU SEE THEM?

Three young killdeers crowding in the nest and one unhatched egg are here shown. The young birds are even more protectively colored than the eggs and crouch at the slightest alarm and this makes them very difficult to find.

Saskatchewan to Virginia. The snowy plover of the southwestern states is an even lighter bird with just a suggestion of the breast band and face markings of the other species.

All of the plovers have long legs and relatively shorter

DIGEST OF OPINIONS ON FORESTRY

WILL YOU NOT CO-OPERATE WITH US BY IMPRESSING UPON THE EDITOR OF YOUR NEWSPAPER THE IMPORTANCE OF FORESTRY? WRITE TO YOUR NEWSPAPER

ONE of the most remarkable examples of service to their readers is shown by the editors of the country in their endeavor to present to the readers stories having to do with outdoor life. To the editor, perhaps stronger than any other man, comes the call of the great outdoors. And the editors in a vast majority of cases answer that call less than any other set of workers. But they have the great opportunity to present the beauties of nature and they never weary in this well doing. Columns upon columns are being printed in the various publications of the country today in regard to trees and the value of forestry as a result of the suggestion of the American Forestry Association that memorial trees be planted in honor of the men who lost their lives in the great war and in honor of those who offered their lives. The comment goes into other fields and is here condensed for the readers of the American Forestry Magazine with the request that they in turn keep the importance of forestry before their local editors. There never was such an opportunity for the members of the Association to do a great work and the editors will welcome anything you have to say of a constructive nature.

Commenting upon memorial tree planting the Milwaukee Journal says:

"It is not enough to build good roads through the country side. We should beautify them."

Then the editor goes into the possibilities and beauties of trees planted along these roads. According to the New York Evening Mail there are "Excellent possibilities for a great national work of forestation presented by a movement started by the American Forestry Association for the planting of victory oaks or victory elms to commemorate the soldiers who laid down their lives on the battlefield."

The Florida Times-Union of Jacksonville points out that Florida's prosperity depends on its rescuing of the forests far more than most persons are aware. A dispatch to the Philadelphia North American dated at Harrisburgh, by H. G. Andrews, points out the immense income that is possible through the forests of Pennsylvania. The article goes on to show those possibilities, how the chestnut trees have been killed by the blight and points to much constructive work that can be done.

The Christian Science Monitor calls attention to the fact that the Maine Legislature will take up the question of a

state forest reserve while an editorial in another number says:

"Practical forestry is being presented as a line of work to interest returned soldiers who have grown to love an outdoor life."

The importance of forestry is so great in the eyes of the editors of the Dallas Evening Journal that in an editorial they suggest that it be taught in the public schools. The Journal adds:

"The destruction of timber in the last half century has been little short of criminal. The way of the father has been foolish and their sons should be pointed the wiser way."

The Realty Magazine of New York gives the lead position to the value of tree planting in home making and uses many pictures. The Farm Journal of Philadelphia has an article by Charles P. Shoffner who writes:

"Now and then a suggestion is made that strikes thirteen. Here is one by the American Forestry Association that rings true. They say: 'let a tree be planted in memory of each fallen hero.' Could a finer tribute be paid? There is something so beautiful, so noble and so uplifting about a tree that makes it a memorial worth while."

Memorial Tree planting is a move in the right direction, says the editor of the Metropolis at Jacksonville, Fla., who goes on to say: The announcement that the Women's Clubs of Florida intend to urge the planting of trees, as memorials to brave men who entered their country's service in the world war, is a move in the right direction. It indicates a move that has everything to commend it. It is both patriotic in spirit and leading the way to a greater and more general appreciation of trees.

Trees in themselves are a thing of beauty and of utility in the Creator's design of the universe as a place fit for human habitation.

The work of the foresters in France has always been an interesting subject to the editors, and they have carried many feature stories on this work. That a Frenchman knows how to grow a tree while an American knows best how to cut it down, and turn it into lumber, is the conclusion of Captain J. K. deLoach of Atlanta, Georgia, who has been in charge of the machinery of the mills operated by the United States Army in the vicinity of Vourges, France, where the Twentieth Engineers (Forest) have been producing large proportions of the lumber used.

"Before we came into the bourgeois region," says Captain deLoach, in the Baltimore Sun,

"there were nine French mills operating, getting out a total of 10,000 feet a day. Under pressure recently, one of our American mills turned out 70,000 feet in three days. A hurry call came through for road plank to be used in the Argonne so that artillery and transport could be kept moving forward without sticking in the mud. This one mill, planned to produce 10,000 feet a day, averaged more than 22,000.

"Under normal conditions we use culls for road plank, but there was not time to select or choose in this emergency. We went through everything as it came. The planks were all five inches thick and we turned out some more than 12 inches wide as fine, clear stuff as I ever saw. War is certainly wasteful.

"The French lumbermen come close to tears as they see the speed with which we fell and cut their trees which they have carefully tended for decades. There is small chance of their adopting our methods. They say we are too fast; that it takes too long to raise a tree to cut it up so quickly.

"The American foresters have done wonderful work under difficult conditions. Away off in lonely camps they have had none of the stimulus which comes with excitement and it has been hard for them to keep going with enthusiasm at top speed. The Young Men's Christian Association has helped greatly. It establishes huts and tents out in the camps, gets supplies, entertainment, motion-pictures, reading matter, athletic supplies, writing material and even pianos to the men, makes life bearable and so keep spirits up."

A survey of the forests in Cook County, Illinois, furnished a very interesting and amusing story for the Chicago Tribune. The picture of the beauties of the woods in winter is well told and the whole story tells the trip of the Armour Club and the Prairie Club. The expedition was under the guidance of Dr. Jorgenson, director of Armour Gymnasium and the Chicago Tribune gives nearly three columns to the discoveries made by the two clubs. In these days of paper conservation it will be understood that it takes what editors call a "Corking Good Story" to get that space.

The Trenton, New Jersey, Times in an editorial says there is a special message for Trenton because of the suggestion of Dr. Frederick of the Art School, in regard to a civic center. This is to include the site of the city's new hotel and a proposed war monument. This special message means much to Trenton, the Times points out because:

"The President of the American Forestry Association and the head of the National War Garden Commission, misses no opportunity to get things planted and it will be well if people generally will follow his lead. He urges the planting of trees and the planting of gardens particularly during the coming spring and summer. There is need for united and persistent effort in both directions. Just now Mr. Pack is especially interested in the planting of trees as memorials

for the American boys who paid the supreme sacrifice in the war for democracy. He points out that in addition to being beautiful living memorials to the nation's heroic dead these trees we plant will be a thing of beauty and joy forever to those who live not only now but in the years to come and in some places it may be deemed advisable and possible to set out great forests in honor of the soldier dead."

The Times then goes on to point out what can be done with the proposed civic center if adorned with trees not only as memorials but as an artistic setting for the city plaza and any buildings that may be erected on it.

In a special dispatch to the New York World from Greensboro, North Carolina, the statement is made that:

"Unless some action is taken by the Federal Government, and that quickly, the Brevard section and with it much of the best farming and timber land in western North Carolina will be washed away by the high water during the next five years. During the last year this section has experienced three damaging floods."

According to the Houston Post:

"The Texas Forestry Association has never received the attention that organization deserves from the people of Texas. With 25,000,000 acres in woodlands, Texas has a greater interest in the present forests than has any other state. With more than that number of acres in what appears at times to be desert, Texas cannot afford to ignore the forestry problem."

The editorial goes on to say that W. Goodrich Jones, President of the Texas Forestry Association, has sent to the papers of the state letters in which he pleads with the press for the forests of Texas and the Post adds:

"The State Forestry Department deserves the intelligent support of the legislature."

A great lesson has been learned from the war, the Northwestern of Oshkosh, Wisconsin, points out in an editorial:

"More attention to Forestry."

Scientific forestry now is being taught at twenty-three universities and colleges in the country, the Northwestern says, and points to the heavy drain on lumber supplies and the fact that the coming period of reconstruction will perhaps call for even larger quantities of the raw materials furnished by the lumber industries. The Inquirer of Owensboro, Ky., comments on the offer of the American Forestry Association to help reforest France and points out the great opportunity for further cementing the cordial relations of the two countries.

The memorial tree suggestion is very pleasing to the editor of The Times at Chattanooga who says:

"It is a fine thought that we should plant trees in memory of the men who gave their lives to the nation in the great war. More and more the common sense thought of people is steering away from the notion of respect for the dead by erecting over them at home or elsewhere monuments of dead stone; structures often the very reverse of artistic or ornamental."

Chattanooga, The Times goes on to say, is subject to some extent to the "Monument Habit." The planting of memorial

trees gives a new significance to the next Arbor Day, writes the editor of the Geneva, N. Y. Times:

"There is hardly a community in America," continues the Times, "to which the suggestion is not a practical appeal."

In an editorial in The Post of Boston, the editor points out that Lynn City Council has taken action in the matter of memorial trees and says the Post:

"The beauty and fitness of these planted memorials is very apparent. Trees are always things of grace and as proposed would be growing stars of service well done. How could the memory of our heroes be better perpetuated than in a beautiful forest park?"

The Observer at Hoboken, N. J., comments on a suggestion to make community Christmas trees permanent.

Papers of Illinois are commenting generally on the suggestion for tree planting made by Governor Lowden:

"So great is the need of more trees," says the Clinton, Illinois, Public "and so manifest their benefit to future generations that society would be justified in going to great lengths in stimulating tree cultivation."

The Review of Decatur adds its indorsement to tree planting. The Hayfield, Minnesota, Herald in an editorial suggests that the planting be not attempted all in one year, but that every Arbor Day be made a memorial tree planting day. The editor of the Press at Utica points out that:

"If three or four thousand trees were planted in Utica as memorials for soldiers who wore the uniform it would be a splendid contribution to the shade, the beauty and the general attractiveness of the place."

The Dalton, Georgia, Citizen in an editorial says that:

"Out of the maze for suggestions for memorials that have followed the signing of the armistice stands apart from all others because of its simplicity and lasting qualities the suggestion for the planting of a tree for each one who made the supreme sacrifice."

The editor of the Republican of Columbus, Indiana, says the planting of memorial trees along highways is peculiarly fitting.

"It seems to make visible, says the editor, 'that glorious immortality for which the soldier laid down his mortal body.'"

The American City in an article called "Tree Planting an Important Part of City Reconstruction Program," devotes extensive space to the possibilities of city beautifying. "A great benefit to the people of the state" is the view of W. E. Barber, chairman of the Division of Wild Life Conservation, in a letter to the Milwaukee Journal. The editor of the Lafayette, Indiana, Courier calls the planting of memorial trees a most appropriate method of supplying fitting memorials in honor of our sailors and soldiers. In commenting on the suggestion for planting memorial trees in honor of Colonel Roosevelt, the editor of the Telegram of Portland, Oregon, says:

"We venture to say there is no suggestion that would have pleased this great American better."

In the opinion of the editor of the Hammond, Ind., Times:

"Colonel Roosevelt deserves a memorial in which the entire nation can take pride" and then it goes on giving an indorsement of the suggestion of the American Forestry Association for planting trees in honor of the Ex-President.

The Manufacturer's Record carries an article from W. W. Lee, county superintendent of education, Prentiss, Miss., who urges a reforestation plan to be undertaken by the school children. Mr. Lee has a plan for organization of pine tree clubs. With pictures to illustrate an article "The Coos County Forests," The Scientific American gives the leading position to an article on the wonders of the region on the western side of the Coast Range Mountains. The Morning Press of East Stroudsburg, Pennsylvania, urges the planting of memorial trees in an editorial in which it used the poem by Joyce Kilmer.

Editors take up other subjects having to do with outdoor life. In addition to commenting on trees, and their value, the Boston Evening Transcript comments at great length on "The Bird Treaty Makes the Birds Safe." Mr. Winthrop Packard takes up the discussion of the mistakes and the conflicting views given in recent news articles on this subject, and in the introduction to his article says:

"Birds are safe so far as good laws can make them. Let not your heart be troubled."

In the Denver Post "Lord Ogilvy" has an article pointing out to the farmer why he should make a friend of Bob White.

The Times-Star of Cincinnati, has an editorial on "Man's Ingratitude to the Bird." The editor of the Times-Star points out the tremendous reproduction abilities of the insect, and shows how the world would become a desolate waste and man starved out unless the insects are checked, but says the editor:

"Between man and this state of desolation stand some natural barriers. One of these is the army of birds which feed on insects. With the destruction of the bird; who stand guard over our fields and forests, a catastrophe beyond imagination to perceive would ensue. And yet man plunges blindly along the fulfillment of the grim paradox he has conceived. Every year he slays by millions the feathered friends who are his."

These short reviews, showing what the editors are ready to do in the way of co-operation, should be an inspiration to the members of the American Forestry Association and again the call is issued to each of our members to co-operate with his local editors in every way by calling their attention to forestry needs in his own locality. He will be glad to listen to you or to hear from you if you make your point clear and keep it short.

FORESTRY PURSUITS FOR DISABLED MEN

THE Federal Board for Vocational Education, which has been charged by Congress with the re-education and rehabilitation of war disabled men, has made an investigation of the subject of forestry and forestry pursuits as offering opportunities for these disabled men to train for.

A surprising amount of interest is being displayed in the subject and it bids fair to become one of the popular courses placed at the disposal of the disabled men.

This education is given at approved universities, land grant colleges and other institutions. The disabled man, if single, is given a support and allowance, or "training fund" of \$65 per month, and all his expenses of tuition, material, library and laboratory fees, are paid by the Federal Board. If he is married and lives with his wife during his period of study, he is allowed \$75 per month and \$10 per month for each child up to three.

When he has completed his course, the Employment Placement Division of the Federal Board will help him in securing a position.

There is no time limit set upon the course. The aim is solely to make a competent, thoroughly trained man out of the student.

The following extracts from the "Opportunity Monograph" on Forestry Pursuits, issued by the Federal Board, will be found of general interest.

What Forestry Is:

"Forestry is the business, or the art, or the science, depending on the point of view from which you look at it, of handling forests for timber production or stream-flow protection. It does not, as is often mistakenly thought, have anything to do with fruit trees, or even with street and park trees. The care of these comes under horticulture and arboriculture. Forestry is distinct from either in that it has to do primarily with entire stands of trees, or forests, rather than with individuals. Forests are really nothing more nor less than tree societies, or communities, comparable in many ways with human communities, every member of which has an influence upon and in turn is influenced by its neighbors; and it is this fact that gives to forestry its distinctive character.

"Forestry should also not be confused with lumbering. Lumbering has to do merely with harvesting the trees on any given area, with cutting them, transporting them to the mill, and converting them into lumber or other products. While the chief task of the forester is to manage forest lands, he has to do with the production of trees as well as with their utilization. Forestry is concerned fully as much with the future as with the present. Like agriculture it looks forward to keeping the land continuously productive by the growth of successive crops. Only in the case of forestry the crops instead of being wheat, or rye, or corn, are trees, which in turn can be converted into fuel, fence posts, telephone poles, railroad ties, wood pulp, lumber and a host of other wood products. How much the forests mean to the economic development of a community through the crops which they produce and the employment which they offer is evidenced only too plainly by the desolation which has followed destructive lumbering in many a once prosperous forest region.

"In addition to yielding crops which have a commercial value, forests in mountainous regions perform another important function which is none the less valuable because its benefits are difficult to measure in dollars and cents. By decreasing erosion and regulating stream-flow the mountain forests conserve water for domestic supplies, irrigation, power and navigation, and at the same time help to lessen the damage caused by destructive floods. So far-reaching is this influence and so great is the population affected by it, that the treatment which such forests receive becomes a matter of vital interest to the general public. One of the primary concerns of forestry is to see that forests are handled in such a way as to afford the maximum amount of protection, even if this involves, as it not infrequently does, the restriction or entire prevention of lumbering operations.

What Foresters Do.

"In order to handle to the best advantage the area under his charge there is a wide range of work which a forester may be

called upon to do. He must be able to identify different kinds of trees and must know the uses to which each can be put and the sites to which they are best adapted. He must be able to map the area and to determine the amount and value of the timber upon it. He must be able to draw up a complete plan for protecting the forest from fire and to carry out the details involved in its execution. He must know how to control the attacks of destructive insects and fungous diseases. He must be able to handle the many details connected with the collection of seed and the production of young trees in forest-tree nurseries. He must know where and how to plant these, or how to sow the seed on areas where this is preferable. He must know whether any given stand is too dense, and if so, what and how many trees should be taken out to stimulate the growth of those that are left. He must be able to determine the rate at which trees are growing and the age at which they should be cut and to make plans for harvesting them in such a way as to secure natural reproduction. And finally, he must be able to draw up a "working plan" providing in detail for the handling of the entire forest in such a way as to keep it continually productive.

"All of this obviously involves a good deal of office work in the formulation of plans, the maintenance of records, and the miscellaneous administrative work connected with any business enterprise. It also involves a good deal of practical out-of-door work. The average forester must take long walks and horseback rides. He must often camp out in a tent or with no shelter whatever. He must take his part in fighting forest fires, which means the liberal and energetic use of the ax, the mattock and the shovel. He must run compass and transit lines and make topographic maps. He must estimate the size and contents of standing trees by the use of calipers and height-measures, and must scale the fallen timber. He must mark, or blaze, the trees to be removed in lumbering and must see that the operations are carried out in accordance with the approved plans. He must collect tree cones, extract the seeds from these, sow them in the nursery, care for the young seedlings and later set them out in the forest.

"He must also do a hundred and one other things which are not strictly forestry but which are so closely connected with it that they must be handled by the forester along with his other work. Grazing is a good example of this, since most of the forest regions in the United States produce forage as well as trees. In order to utilize this to best advantage the forester must know how many stock the range will support and how they should be handled. In regions where mineral deposits occur he must be familiar with the mining laws and must have at least enough knowledge regarding mining to enable him to deal intelligently with prospectors and others. Since most of the forests occur in undeveloped regions he must know how to open these up by building ranger and lookout stations and by constructing such other permanent improvements as roads, bridges, trails and telephone lines. In short, the average forester, particularly in pioneer regions, must be a veritable jack-of-all trades.

Where Foresters Work.

"Forestry is primarily an out-of-door occupation. Some indoor work in the formulation of plans, writing of reports, handling of correspondence, and other office routine, is of course necessary, particularly in the case of those charged with the administration of large areas. But the average forester must spend the bulk of his time in the open, in the forests for which he is caring. Sometimes his headquarters may be in a small town or sometimes in a more or less isolated situation in the woods themselves. In either case his daily work will ordinarily take him into the open in sunshine and in rain. Occasionally he may be absent from home for several weeks at a time carrying his bed and provisions on his back, or, if he is fortunate, on a pack animal.

"So far as geographical location is concerned, opportunities for foresters have heretofore been mainly in the mountain regions of the West where the National Forests are located. As forestry comes to be practiced more and more on State Forests and on private lands, however, similar opportunities will develop in the East. There is no reason why large numbers of foresters should not eventually be employed wherever forests occur, and this means practically throughout the country except in the Great Plains and in the farming regions of the Central States and Middle West.

What Handicaps Are Serious.

"Generally speaking, a forester must be able-bodied and in good physical health. He must have a strong heart, sound

lungs and a constitution able to stand exposure to all kinds of wind and weather. Heart disease, tuberculosis and other serious organic troubles are handicaps that point to the choice of another occupation.

"On the other hand, there are certain disabilities, and particularly injuries of various sorts, that do not constitute any serious drawback. Injuries to the mouth, nose, ears, scalp and other parts of the head, for example, do not disqualify unless they interfere to a dangerous extent with one's eyesight or hearing. Some deafness is allowable provided it has not gone so far as to prevent communication or to endanger one from falling trees or other accidents. Even blindness in one eye is not a real handicap if the other eye is still sound. The loss of an arm or a leg incapacitates a man for the physical work required of most foresters, but minor injuries to these limbs, such as loss of a finger or a toe, do not disqualify one.

"For certain specialized duties one can have sustained even more serious injuries and still be able to give satisfactory service. One may be badly crippled and yet be successful in research work, provided he is able to move about more or less freely, has some use of his arms, and can handle a microscope. Men at fire-lookout stations need little more than good eyes and sufficient hearing to use a telephone. On the other hand, one would hardly wish to take up fire-lookout work as a permanent occupation, and unless his condition can be improved sufficiently to enable him to resume active physical work his chances for advancement are poor. Special appliances for handling tools are not necessary, as is the case with many industrial workers. The average forester must be able to turn his hand to a wide variety of activities and to use such homely implements as the ax, the hammer, the shovel and the mattock.

"The danger of further injury is no greater in forestry than in most other outdoor occupations. Accidents due to forest fires, bucking horses, falling trees and rolling stones are always possible, but the proportion of those seriously injured in such ways as these is not large. Those employed by the National Government receive compensation in case of injury incurred in line of duty.

What Training Is Necessary.

"Forestry requires the services of three more or less distinct grades of workers—the professional forester, the forest ranger, and the forest guard. The professional forester handles the larger and more technical phases of forest management. He determines what the forest under his charge contains, how much it is worth, how fast it is growing, when and how it should be cut, what kinds of trees should be favored, and other questions of the same kind; and also exercises general supervision over the execution of whatever measures are decided upon. The forest ranger acts as a sort of semi-technical assistant to the professional forester. He does not need so thorough an education as the professional forester but must have sufficient technical knowledge to enable him to carry out intelligently the plans formulated by the latter. His work is to a large extent 'practical' and involves the routine of fire protection and fire fighting, marking the trees to be removed in timber sales, scaling the felled logs, handling planting operations, surveying, building trails, running telephone lines, and doing other work connected with the administration of the forest. The forest guard is ordinarily a non-technical assistant who helps the forest ranger in those aspects of his work which require little or no knowledge of forestry. Forest guards are frequently appointed for short periods only to help the regular force during the busy season, and particularly in the work of fire protection and fire fighting. Previous experience in the woods or in similar occupations such as lumbering and surveying constitutes a valuable, but not essential, preliminary training for foresters of all grades.

"Twenty-five years ago the professional forester was almost unknown in this country and there was not a single educational institution at which he could secure the necessary training. Today the profession is well recognized and there are more than 20 schools offering instruction of a grade similar to that required of civil engineers, doctors, lawyers, ministers and other professional men. As a basis for the more technical phases of his education the man who desires to become a professional forester must have had courses of collegiate grade in botany, geology, organic chemistry, mathematics through trigonometry, plane surveying, mechanical drawing, economics, and either French or German, or preferably both. With these as a foundation he is ready to go ahead with the technical subjects such as dendrology, silvics, silviculture, forest mensuration, forest valuation, forest management and forest regulation. Obviously a comprehensive training of this sort cannot be obtained with less than four years of collegiate work, at least two of which must be devoted almost entirely to professional forestry subjects. If a man has already had a college education, however, he can readily prepare himself for the profession by two years of post-graduate work. The degree of bachelor of

science in forestry is usually given on the completion of a four-year professional course, and of master of science in forestry, or master of forestry, on the completion of a five-year professional course or of two years of post-graduate work following four years of regular college work.

"For the forest ranger no such intensive training is necessary. With a high school education as a background, one year of rather elementary training in such subjects as fire protection, surveying, timber estimating and scaling, nursery practice, methods of planting, range management and report writing is sufficient to enable a man to qualify.

"In general, the course covers much the same ground as that taken by the professional forester, but in a much briefer and more elementary way. Those who have already had considerable practical experience along these lines can secure a sufficient foundation for their work in three or four months, although even for such men the longer course is preferable if time to take it can be found. Many of the forest schools of the country now offer courses of this sort and the opportunities for instruction are ample.

"Since forest guards are engaged almost wholly on non-technical work no particular course of training is necessary. No one with any ambition, however, would wish to remain a forest guard indefinitely when other opportunities are open to him merely by taking a free course of instruction. If one wishes to take up forestry, therefore, and is not in a position to take the professional course, he should by all means attempt to qualify as a forest ranger. Should lack of other openings then make it necessary for him to serve as a forest guard for the time being, he would be in a position to take advantage of the first opportunity for advancement.

What Opportunities Are Offered.

"Opportunities for employment for foresters may be classed as fairly good. The point has now been passed where the supply is totally inadequate to meet the demand, but at the same time the war has greatly depleted the ranks of foresters throughout the country, and there is no question that many new men will be needed during the process of reconstruction and afterwards. The National Forests already offer opportunities for the employment of many men and it cannot be doubted that similar opportunities will soon be offered in State forests as well as in the case of forests still in the hands of private owners. With the steady decrease in the timber supply, the Nation will soon be face to face with the necessity of practicing forestry extensively as a national safeguard and unless private owners take upon themselves the task, there is little question but that the Federal and State Governments will take matters largely into their own hands.

"Altogether it is a safe prediction that any one who desires to engage in forestry and who qualifies himself for the work will be able to find employment. The entering salary for forest guards in the national service averages about \$900 a year and for forest rangers about \$1,100 a year. Technically trained foresters ordinarily enter at approximately the same salary as forest rangers, \$1,100 or \$1,200 a year, but with greater opportunities for advancement later. In State and private work approximately the same entering salaries may be expected although some private owners may be unwilling to pay quite so much to forest guards and forest rangers at the start.

What Are The Chances For Promotion.

"Chances for limited promotion are reasonably good. It should be recognized frankly, however, that one can not hope to get rich in the profession and that a comfortable living is all that can ordinarily be looked forward to. In exceptional cases unusually able and well qualified men will doubtless be able to draw salaries of \$1,000 and \$5,000 a year. The average professional forester, however, can hardly hope to advance much beyond \$2,500 or \$3,500 a year except by acquiring an interest in some lumber business or in the forest itself. For the forest ranger a salary of \$1,500 or \$1,600 may reasonably be looked forward to. Moreover, this salary often carries with it a ranger station which can be occupied as long as he stays in the service, and also an opportunity to produce some crops for his own use. Forest guards can hardly hope for more than \$900 or \$1,000 a year.

"In other words, in forestry, as in all other professions, the better educated you are the better are your chances for promotion. Even at best, however, the chances for large salaries are small and those who are bent on getting rich should look elsewhere for an opportunity to do so. On the other hand, one who is satisfied to make a comfortable living, to spend a large part of his life in the open, to occupy a responsible and respected place in his home community, and to enjoy the satisfaction which comes from having an important share in a work of great public service, cannot look for a more congenial or attractive occupation than forestry."

LETTER FROM CHAPLAIN WILLIAMS OF THE FORESTRY UNITS

MR. P. S. RIDSDALE, Treasurer of the Welfare Fund for Lumbermen and Foresters in War Service, has received a very interesting letter and report from Chaplain Howard Y. Williams, formerly of the Tenth Engineers (Forest). Chaplain Williams has recently been designated Senior Chaplain of the Forestry Units, with headquarters at Tours. In writing to Mr. Ridsdale, he said: "Your Fund has been a blessing." His letter and report are both reproduced here because they are full of interest, despite the cessation of hostilities.

DIVISION OF FORESTRY
OFFICE OF THE SENIOR CHAPLAIN
A. P. O. 717, FRANCE

November 27, 1918.

DEAR FRIENDS:

Have just come back to Tours after a two weeks' trip of inspection and unlike so many previous times, now that the censorship is reduced I can tell you all about it. Among the 30,000 soldiers that I am father for, we have had a large number with the First and Second Armies at the front. With the armistice on and the changes resulting I had to go over our field there to reassign chaplains, etc. I left for Paris the second day after the armistice was signed and so got in for a half day of their celebration. Unless you have been here for a year, like I have, you cannot imagine the change that has taken place in the appearance and spirit of the people. It is wonderful, the new sunshine that has shed itself everywhere. Even the cities themselves show the change, with their flags, arches, etc., but most of all the lights on the streets in the evenings. I have stumbled all over myself and others in the streets of Paris on the dark nights that have passed, but never again. The whole place is ablaze, and all the other cities and towns have followed suit. Parades were everywhere, but the funniest of all were those French girls who would march down the streets, a number of them in arm. Spying some Americans they would circle around them and repeat, "Do your duty!" "Do your duty!" This meant that we must kiss them all. Well, that was some celebration.

The next day found me at Chaumont, where we have our General Headquarters, and where a branch of my section is located. After a day there of consultation and plans I was on my way in a big Sunbeam auto and with a good chauffeur to the stamping grounds of the two armies. All the way along the road were thousands of troops marching to and from the old battle front. Many were coming back for rest, but other regiments of infantry, cavalry, and artillery were on their way to Germany. The roads were thick with the battle-scarred French on their way to Metz. As you can well imagine the expression of the faces were very different from those I have seen when men were marching to the trenches. Another sight pitiful and yet joyful was the hundreds of prisoners returning from Germany. As you know they were just free and had to shift for themselves. They wore everything imaginable, and carrying all sorts of boxes and packs they made a strange sight meandering along singly sometimes, and then by twos and threes, and crowds. They were directed to great stockades, once used for German prisoners. There every man had to take a bath and go through the louse exterminator. Afterwards they were fitted out by the American Quartermaster with what was lacking in their needs, and then they jogged on their way again, until finally they should hit the railroad. They were now even an odder looking sight for old French, British, and German uniforms were added to by American. A man would have an American hat and blanket topping off an old French uniform, or perhaps instead of the hat khaki breeches used between French blue leggings and a French coat. It was some sight, but they were happy and that was sufficient. Most of the Americans had only been there a short time and it had been a lark to them. After the first few months few Americans had been taken. The men had fought until the last, and never gave in.

Thus I went through Toul, over to Nancy, then by the remains of St. Mihiel, Verdun, etc. I visited my men still living in their dug-outs in what was once No Man's Land. I had taken some phonographs along and new records from friends in the States. It did seem odd to hear the music being played when outside all was torn to pieces, woods were shattered, only stumps remaining, barb wire stretches everywhere

until one would think there had never been so much in all the world. We have had several groups of engineers working in the Argonne Forest, where the Americans did their best and hardest fighting. It almost seemed sacred ground when I thought of the price that had been paid to gain it. Where before the shells flew and raged, now all was quiet. Our companies are all through and right up to the Hindenburg line and beyond to where the last days found us. We leisurely strolled through German trenches which they had thought were secure forever. Made of concrete, the officers had pool tables, baths, and then chicken and rabbit coops for the means of dainty needs. How we fooled them. When one sees the damage that German shells did to us, he wonders how more could be done, but when one goes over that Hindenburg line and on to see what we did to them he sees that more. The land in these quiet days looks as though tornadoes and earthquakes had tossed and rocked her to the utmost. Towns have not a wall left standing. Trees are cut and stand only in shreds. Here and there are those machine gun nests which took such deadly toll. You hardly notice them as they lie covered under little mounds of grass, but careful observation reveals the slit in the concrete through which they pour their deadly hail. One near St. Mihiel was the worst I have seen. It was at a cross-corner and covered three roads. It looked like an innocent mound decorating the street corner, but a close-up view showed the opening which covered the surrounding country. We leisurely visited the trenches and picked up enough souvenirs to start a small war of our own, guns, shells, German helmets, pieces of barb wire, etc.. Will have plenty to show you when I return.

Many are the friends that I have renewed acquaintance with again on this trip. My heart always beat a little faster when I ran across men from my old regiment, the Tenth Engineers, who have been promoted and commissioned and are doing work with other units. I sort of feel as though we were brothers. Then I saw Croyle and Davis of my days at Union, and Heinzman of the days at Iowa. So it was wherever I went, I ran into some of the friends of by-gone days. Then on Sunday last I arranged to spend the day with one of my old companies. I had three meetings and it was some re-union. My regiment is going back sometime in late December. How I should like to go with them. I telegraphed to G. H. of my desires but also of my willingness to remain if they thought it for the best interests of these engineers who look to me as their senior chaplain. The word came back, "You should remain," and so for two or three months or longer I shall continue on the job here. I now have sixteen chaplains assisting me, but expect to have twenty-five soon. The men who are going home are of course delighted, and the men who must stay are down-cast. Of course we would all like to come home, but there is work still to be done here, and as I am well acquainted with the field I am ready to stay and do my best, always looking, however, for the day when I shall be off for Hoboken and home.

Thanksgiving has passed and Christmas will soon be here. Surely we had more to be thankful for than we dreamed even a month before. We are proud of you at home and the splendid way in which you have backed us up. Am sure that you have found joy in service well done, even as we here have done. My heartiest wishes for the Merriest Christmas and a New Year resplendent in opportunities of service in the spirit of Christ, our Saviour.

Faithfully your friend,

HOWARD Y. WILLIAMS, Senior Chaplain, U. S. A.

To keep up our pep it has been my purpose to publish once a month such a news sheet as the following. Our immediate departure makes our first effort the last. G. H. has asked me to remain here in my capacity as Senior Chaplain for Forestry Units, and so I shall not be with you on the return trip, much as I should like to be. In spirit I shall be with you.

May our Heavenly Father bless you all richly as you go back to civil life. I shall hope to see you all in later days, and shall always be glad to hear from you at 3326 Oakland Avenue, Minneapolis, Minnesota. Just remember that I am ready at any time to marry you to that "best girl in the U. S. A."

I shall always count my experiences with you as very precious. Good-bye! God-speed!

HOWARD Y. WILLIAMS, Senior Chaplain, Forestry Units.

Sergeant George A. Callaway was commissioned second lieutenant, October 8th, and is assigned for duty at Aureilhan Camp.

Sergeant Robert S. Henry succeeds Lieutenant Callaway as Sergeant in charge of the mill operations at Aureilhan.

Lieutenant Charles T. Kraebel, formerly sergeant in Co. B, later with "The Stars and Stripes," is now with Captain Swift Berry on reconnaissance work.

Lieutenant W. F. Ramsdell formerly sergeant with Co. B, is at present stationed at Headquarters, 2nd Dist. Depot Division, 1st Corps. Sergeant Glenn C. Fullenwider, who has had charge of part of the woods operations at Courant River Camp, left for Haute Marne on November 5th. He is now a student in the Engineer Officers' Training School.

Lieutenant River Camp is now operating a steam skidder to skid logs from the wood to the river.

Owing to the extremely low water in the river we have experienced a good deal of difficulty in logging the Aureilhan mill. Conditions have improved somewhat with the recent rains.

The following promotions were made in the company November 7, 1918:

Hugh V. Badertscher, from sergeant to first sergeant; Oliver M. Savre, from corporal to sergeant; Fred M. Reed, from wagoner to sergeant; Carl W. Labhart, from private first-class to sergeant; Samuel A. Brasher, from lance corporal to corporal; Chas. W. Cook, from private first-class to corporal; Ray O. Pattison, from private first-class to corporal; Mathias B. Stonestreet, from private first-class to corporal; Robert K. McClelland, from private to corporal.

Co. C, 10th Engineers, Pontenx (Landes).

We received the news yesterday that the Armistice had been signed and of course the French people here just went wild, the same as every other place in France. They burned the Kaiser in effigy in Pontenx and had a big lantern parade. The thing that makes me sore is that they did not allow the mills to shut down and give the men a chance to celebrate. One of our men stole the big nut off of the saw mandrel, and we had to shut down until we found it. It certainly was a kid trick, but it gave the night crew time to celebrate.

We broke all records last month, and also won the cut in September. We cut 99,050 feet one day last month, and nearly 1,800,000 feet for the month. The spirit has been better in the last three months than I have ever seen it. The men have certainly done great work. They are tackling everything as though they were playing a long game of football. There is a great deal of rivalry between the woods crew and the mill crew, and also between one outfit and the other mills.

1st Detachment, 10th Engineers, Donzy (Nievre).

At the end of August, the 1st Detachment completed the Mortuier Operation near Gien, in so far as available saw logs were concerned, and moved overland, a distance of some 80 kilometres, to the new operation near Ciez-Couloutre. The dismantling of the mill, moving of camp, mill and equipment overland and the setting up of the new camp and mill at Ciez-Couloutre was accomplished in one week—which was pretty quick work. The new operation consists entirely of oak, running to fairly good sized stock, with large quantities of coppice, now being cut by quartermaster and artillery troops.

Captain Benedict left this station the latter part of September to assume command of old Co. D of the 10th, and First Lieutenant T. H. Hughes of the 13th Co., 20th Engineers was assigned as Commanding Officer. Lieutenant Hughes has since been appointed captain.

Second Lieutenant W. E. Brown has been appointed first lieutenant and is still in charge of the mill and shipping end of this operation. Wagoners Frank H. McAleer, Reuben P. Miller, George M. Isinger and Sergeant Michael E. Borchardt were transferred to the Motor Transport Corps as motor drivers the latter part of August and we have since heard that they were driving trucks in the midst of the "Big Push" at St. Mihiel. McAleer returned on a short leave and told some very interesting tales of his experiences at and near the front.

Corporal Fred H. Miller has been transferred to the Army Candidates School.

The following is a list of recent promotions in the 1st Detachment:

Earl Weaver has been appointed sergeant. Ed Harrison has been appointed corporal. The following were appointed wagoners: Thomas A. Clark, James W. Yates, Leroy T. Rickey, Carl E. Speaks.

Co. E, 10th Engineers, St. Julien (Cote d'Or). Promotions

Lieutenant Haworth from second to first lieutenant. Lieutenant Herrick, from second to first lieutenant.

Sergeant Grant attended training school and received a commission as second lieutenant in the engineers.

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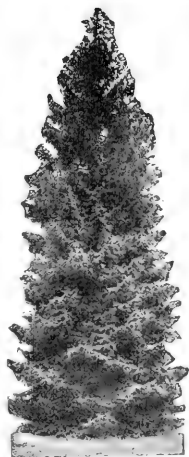
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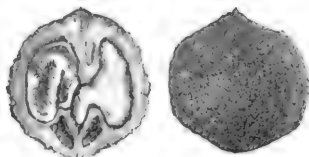
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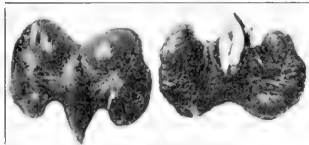
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TREE SEEDSMAN

Dresher

Pennsylvania

Broxon has been made a second lieutenant in the fuelwood work.

Sergeant Jones is now first sergeant.

The following are our new sergeants: Manning, Hawke, Bradfield, McClosky, Bal-singer and Bert Reed.

Backus (known as Goldie), one time cook, is now a corporal in charge of the railroad construction.

In October I understood that our operation set a record cut in hardwood, 20 M' mill class, for France.

We have a fine camp here, also the beginning of a band.

Co. F, 10th Engineers, Levler (Doubt)

The 37th Co. formerly Co. F, established a new record for mills of the Forestry Regiment on October 30, 1918, by cutting 163,000 board feet of lumber in two ten-hour shifts. The mill has a rated capacity for two shifts of only 40,000 board feet.

The newest thing in non-coms are Sergeants Alexander, Muzzall and John J. Poitevin, and Corporals Rene H. Meroux and James O. Hutchings.

Private Ward G. Rush returned to familiar scenes October 29th after having spent eleven months in various hospitals in France receiving treatment for ear trouble. He was as glad to return as we were to see him.

Captain Fred Morrison treated the men of his command to a most sumptuous feed on Sunday, November 3rd, in celebration of the record cut made by the sawmill recently. Uncle Sam will have to go some Thanksgiving Day to equal it in variety, quantity and appreciation.

An item of unusual interest occurred November 2nd—some first-class mail arrived.

It seems that Turkey knew she couldn't last longer than Thanksgiving Day, so she capitulated while the capitulating was good.

Master Engineer, Senior Grade, Parrish and Sergeant, First-Class, Adams are wearing Sam Brownes, having received commissions in the Engineer Corps recently. We bucks are all glad to salute them.

Lieutenant Adams received his commission while in the Camp Infirmary with the mumps. Don't tell the rank and file he wasn't "swelled up" over it. Well, it's the kind of inflation that isn't permanent.

First Lieutenant Vandell Y. Miller has been assigned to this command as Camp Surgeon. We have learned to know and like him.—The regulation O. D. Pills never were better.

We are glad to see Major Mckay again. He returned recently from A. P. O. 714 where he was attending the Sanitary School.

Ex-Corporal Charles M. Rose, Chef de Gare of D'Yoches, has been appointed a sergeant.

No Reports Received From Companies A and D

TRAGEDY OF FRENCH TREES

BROKEN homes, ruined factories, shattered churches, violated graves, it had seemed to me we had rung all the changes on the destruction of war. But there remained one—the tragedy of the trees—says a writer in McClure's Magazine. You can rebuild houses, churches, towns even—for that takes only money. But you can't rebuild orchards of fruit trees and avenues of great shade trees—for that takes time. We were seeing them everywhere now—orchards with trees that were but faded, shriveled branches of brown leaves lying on their sides; orchards, where these had been cleared away that showed nothing but white-topped stumps. They say that when the warm spring came, some of these orchard trees, lying on their sides but not wholly severed, leafed gently and then—just before they died—bloomed once again for France.

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WOODEN SHIPS

RETIRING from his post as manager of the Federal Shipping Board's woodship division, Mr. James O. Heyworth declared that the construction of these vessels has been justified by the valuable service they have rendered "in both coast-wise and transoceanic runs." Of one hundred and one wooden ships completed and delivered to the Shipping Board up to December 1st, last, he reports ninety-four now in active service. Eighty-five of these, according to the records now in hand, "have made in all 305 voyages, covering a total of 490,422 statute miles." Wooden ships brought last year's Hawaiian sugar crop to the States. They plied from San Francisco to Manila, from Pacific coast ports "to Africa and Antofagasta, Chile; from Antofagasta to gulf and Atlantic ports; from gulf ports to Atlantic ports," and thence "to Halifax, Bermuda and the Virgin Islands." They carried canned goods, cement, nitrates, coal, sulphur, general cargo, "serving their purpose by releasing from essential trades," in waters outside the war zones, "vessels that could meet the requirements war zone conditions imposed."

Admitting that the "hopes of the proponents of wooden ships as to speed of construction were overly sanguine," Mr. Heyworth says, nevertheless, that, "measured by performance, the entire wood shipbuilding program has shown an efficiency of over seventy-two per cent," which compares very favorably, to put it in the mildest terms possible with the efficiency shown by, for instance, the "fabricated shipbuilding program." And he expresses the belief that the wooden ships will continue in peace time "to serve a useful and profitable purpose." Their carrying capacity and steaming radius may be increased, he suggests, by the use of fuel oil instead of coal. "Such opposition as has arisen among operators to the wood ship is based," he explains, "not so much upon the material of which it is constructed as it is upon its size and consequently small carrying capacity." The fuel oil suggestion is evidently presented to meet that objection.

WILLOW FOR ARTIFICIAL LIMBS

THE Forest Products Laboratory at Madison, Wisconsin, is working on the drying of willow for artificial limbs. There is a shortage of material and the demand for artificial limbs will increase. It takes from three to five years to air-season the stock, but indications are that it can be done in kilns in from 60 to 70 days.

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SOLDIERS AND SAILORS**

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

DURING the month of December Messrs. Clyde Leavitt, Robson Black and Ellwood Wilson, went to Halifax, Nova Scotia, to attend a conference of prominent lumberman and the Hon. O. T. Daniels, Attorney-General and Minister of Lands, to try and get a forest service established in that Province. Nova Scotia is now the only Province without such a service, forest lands in the prairie provinces being administered by the Dominion Forest Service. While Nova Scotia has very little left of her Crown Lands, the lumber industry is a very important one and it was felt that the time had arrived to give more intelligent care to her timberlands. The conference lasted nearly all day and the Premier took part for a few minutes. The Minister listened to all that the advocates of a forest service had to say, but decided that the time was not yet ripe for such a step in view of the fact that the Province has practically no revenue from its Crown Lands and the Minister feared that if such a step were taken the expense might increase from year to year. He was willing to take the step if some means of financing it could be found and an effort will be made to get the timberland owners of the Province to subscribe sufficient money to engage a Provincial Forester. Nova Scotia has had a pretty good forest fire record until the past season when the fires were bad and a good deal of timber and some property was destroyed.

Mr. Leon A. Nix, a graduate of Syracuse Forestry School, and recently with the Chemical Division of the United States Army, at Baltimore, has been made assistant to Mr. Galarneau, Forester for the St. Maurice Paper Company, with headquarters at Three Rivers, Quebec. Mr. Galarneau will begin his work with a map and estimate of the timber lands of the company.

The annual Forestry Conference under the joint auspices of the Canadian Forestry Association, Co-operative Forest Protective Association of Quebec and the Woodlands Section of the Canadian Pulp and Paper Association, was held in the Windsor Hotel, Montreal, on the 29th and 30th of January. This is the blue ribbon forestry event of the year in Canada and was attended by practically all of the pulp and paper and lumbermen of Eastern Canada. The subjects discussed were all thoroughly practical. Colonel Graves of the United States Forest Service, Brigadier-General J. B. White, D. S. O., commanding

the Canadian Forestry Corps, and Mr. E. C. Hirst who did such good work with the New England Lumbermen's Unit in Scotland told how lumbermen helped to win the war. There was a very interesting discussion on the necessity for slash burning to reduce the number of forest fires and to help prevent insect ravages. A full discussion by experts of the use of flying boats or aeroplanes in forest fire patrol and forest mapping and reconnaissance illustrated by moving pictures and lantern slides. The use of light tractors in logging operations was considered and an actual demonstration was given. The committee of the Woodlands Section on possible improvements in logging operations brought out much discussion of interest, and the meeting was a very live one.

The staff of the Duck Mountain Forest Reserve, of the Dominion Forest Service, have sent out a very attractive calendar showing, by photographs of trail cutting, brush disposal and railroad logging, the activities of the District.

The Minister of Lands and Forests of Quebec will introduce at the next session of the Legislature a bill which it is hoped will help to put the present excellent forest fire protection system on an even better basis.

Mr. G. C. Piche, Chief Forester of Quebec, has gone to France on personal business. It is rumored that he will try and bring back some large contracts for timber.

Mr. R. H. Campbell, Director, Dominion Forest Service, has now quite recovered from his serious accident of last summer and is back at work again, much to the satisfaction of his numerous friends.

The "Alberta Inspection News Letter No. 7," for 31st December is out and is of much interest and full of news of the men of the District and those of the force who went overseas. This letter is gotten out by Mr. E. H. Finlayson, in the interests of his District and is very creditable indeed. We hope it will be continued for the future. Most of the staff have been suffering from influenza and he says "The past few weeks have just 'Flu' by." "One of the rangers has been having a good deal of trouble with the Indians writing all over his fire signs, so recently he sent one of these to the Indian Department at Ottawa for translation and found that

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some young Indian has poured out his heart as follows:

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It is I who wrote this."

The fire season in Alberta has been satisfactory and little damage is reported. Mr. MacDonald, who went overseas from this District, wrote that after falling 15,000 feet in his aeroplane he was a prisoner in Germany and wanted some books sent over so that he could while away the time and improve his technical knowledge. He marked it "Censor-Please rush" evidently having a hunch that the war might soon be over. The Nursery work on the Cypress Hills during the past season was rather unsuccessful owing to much frost and drought. Fourteen men are expected back soon from the front which will enable the staff to resume its old time activities with renewed vigor.

Major W. N. Millar, who went over with the Tenth Engineers, has returned to the University of Toronto to take up his teaching again. He is reported as saying that he thinks that if some military discipline and methods could be put into forestry work and lumbering that it would be a very good thing. He says that whereas ten hours extra work for having a button on one's jacket undone may seem harsh, he feels that such attention to details makes for a better job, and that if all the little things are in order and well looked after, the job as a whole must be a better one.

Prof. R. B. Miller, of the University of New Brunswick, is taking a course at the

Yale Forest School this winter and his place is being taken by Mr. L. S. Webb.

The Lauretide and Riordon Paper Companies have co-operated in buying 1,500,000 spruce trees to plant the coming spring, in addition to those from their nurseries. They will each plant about one million trees.

Copies of "Espana Forestal" which were held back by the war for the past year have just been received, together with the bulletins of the Spanish Forestry Association. These are very interesting and thoroughly up-to-date giving reviews of the forestry publications in many countries, including American Forestry. There is an interesting article about a forestry meeting held in Spain in 1805, another on forest fires in Teneriffe, one on insect pests, and many others well worth mentioning did time permit. The get up and illustrations are excellent, reminding one of the American Forestry Magazine. It is very interesting to see the different view point of the Spanish Foresters, which leans much more toward the esthetic side, so that we have articles on the beauty of the forest and of famous trees and some very good poems together with scientific and technical articles.

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FOREST ENGINEER, 30 years of age; married; eight (8) years experience in South and North-east, in field and administration, desires to make a change. References upon request. Address Box No. 510 Care American Forestry Magazine, Washington, D. C.

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BOOK REVIEWS

Mrs. Allen's Cook Book, by Ida C. Bailey Allen. Small, Maynard & Company, Boston. Price, \$2. In commenting on this volume, just off the press, Lewis B. Allen, Food Editor of the McClure Publications, well says: "The chemical composition of the body requires foods of similar composition. The author of this book in a delightfully simple manner has presented the problem so that, generally speaking, the body may extract from the foods the maximum amount of building and fuel material with the least expenditure of dynamic energy."

"The housewife who studies these chapters cannot fail to find suggestions adaptable, economical and hygienic."

"Mrs. Allen has expressed in popular terms a simple, workable outline of food combination, well adapted to the needs of the housewife. If her book is carefully followed, the dietary of the average family will be much improved, cost decreased and a general gain in health experienced."

Trees, Stars and Birds—A book of outdoor science, by Edward Lincoln Moseley, head of the science department, State Normal College of Northwestern Ohio. Illustrated. Price, \$1.40. Published by World Book Company, Yonkers-on-Hudson, New York.

The innate desire of the child to know about nature out-of-doors carries educational possibilities that cannot be ignored. But nature study as such is still new in the schools and courses and methods have hitherto not been well defined. Everything has been left to the already busy teacher, including choice of subject matter, presentation and conduct of field work. The lack of a suitable textbook has been a serious handicap. To overcome this was the purpose of Professor E. L. Moseley in preparing this new nature study book.

Trees, Stars and Birds covers three phases of nature study that have a perennial interest, and it contains material that will make the benefit of the author's long and successful experience available to younger teachers.

The author is one of the most successful teachers of out-door science in this country. He believes in field excursions, and his text is designed to help teachers and pupils in the inquiries that they will make for themselves. Approximately equal sections are devoted to the three phases of the subject. The topics deal with are those of most general interest.

The text is well adapted for use in junior high schools, though the pres-

entation is simple enough for pupils in the sixth grade. The book can also be used to advantage by such organizations as the Campfire Girls and the Woodcraft League.

CATALOGUES RECEIVED

The beautifully illustrated 1919 edition of the catalogue of Richard Diener Company—gladioli specialists—of Kentfield, California, has just come in.

A booklet—"The Gladiolus Beautiful"—has been put out by Howard M. Gillet, of Lebanon Springs, New York, with full price list for bulbs.

"Burbank's 1919"—a catalogue of fruits, flowers and various economic plants has come from Burbank's Experiment Farms, Santa Rosa, California.

The Southern Pine Association of New Orleans, Louisiana, is publishing a series of booklets, artistic, extremely practical and well illustrated, noticeable among which is one called "Beauty Plus Service in Floors."

"The Modern Gladiolus" with full descriptions and price lists, issued by George S. Woodruff, of Independence, Iowa.

THE Augusta, Georgia, Chronicle makes note of the sale of the nursery and landscape business of the P. J. Berckman's Company, Fruitland Nurseries, Augusta, Georgia, to Mr. Sigmund Tarnok.

NATIONAL LUMBER CONGRESS

A NATIONAL Lumber Congress which is to eclipse anything ever held before in that industry has approached definite form with the announcement of tentative dates, probable speakers and other interesting data.

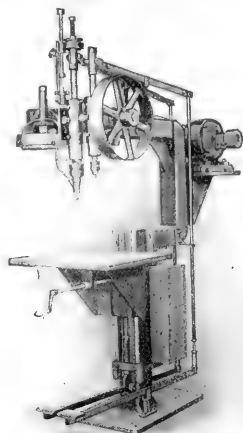
The Congress will be held at Chicago April 14th, 15th and 16th, according to Dr. Wilson Compton, Secretary-Manager of the National Lumber Manufacturers Association, who is busily engaged in planning the details of the proposed affair. It will immediately precede the annual meeting of the National Association on April 17th and it will take in all branches of the industry in a nation-wide discussion of export and domestic problems.

Trade Extension, Lumber Economics and Logging Operations will be among the subjects for the Congress, while the list of speakers so far prepared includes W. B. Colver, chairman of the Federal Trade Commission, tariff commissioner, and B. S. Cutler, chief of Bureau of Foreign and Domestic Commerce.

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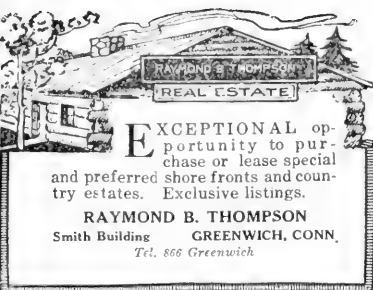
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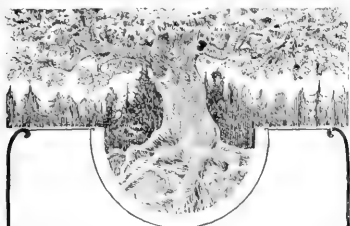
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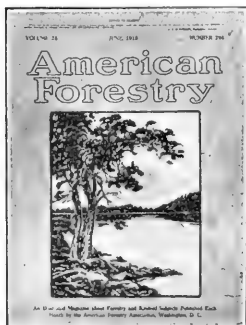
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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interests.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

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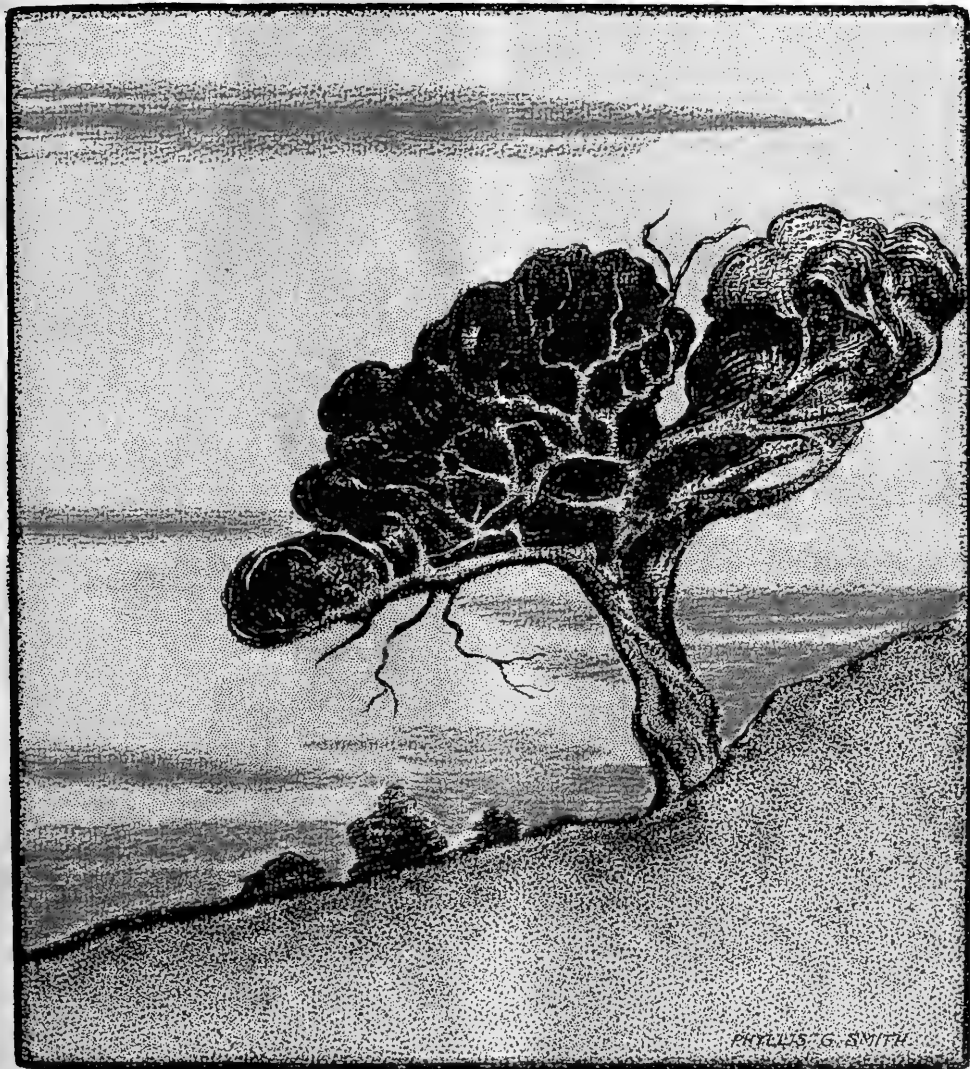
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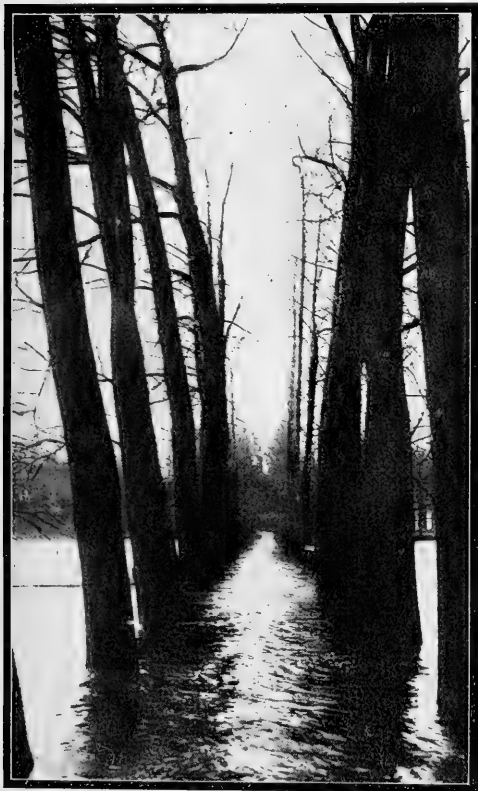
THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

MARCH 1919 VOL. 25

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No. 303



International News Service

EVEN THE RHINE RISES AGAINST THE EX-KAISER!

As if to emphasize the tragic isolation in which that unhappy man finds himself, the house in Holland in which the ex-kaiser has taken refuge is now cut off from the rest of the world by far-spreading floods—and it is the Rhine of all rivers which has thus risen against the fallen war lord of the buns. The photograph shows a magnificent avenue of trees in the rear of the castle, completely flooded, which the ex-kaiser was in the habit of using as a promenade.

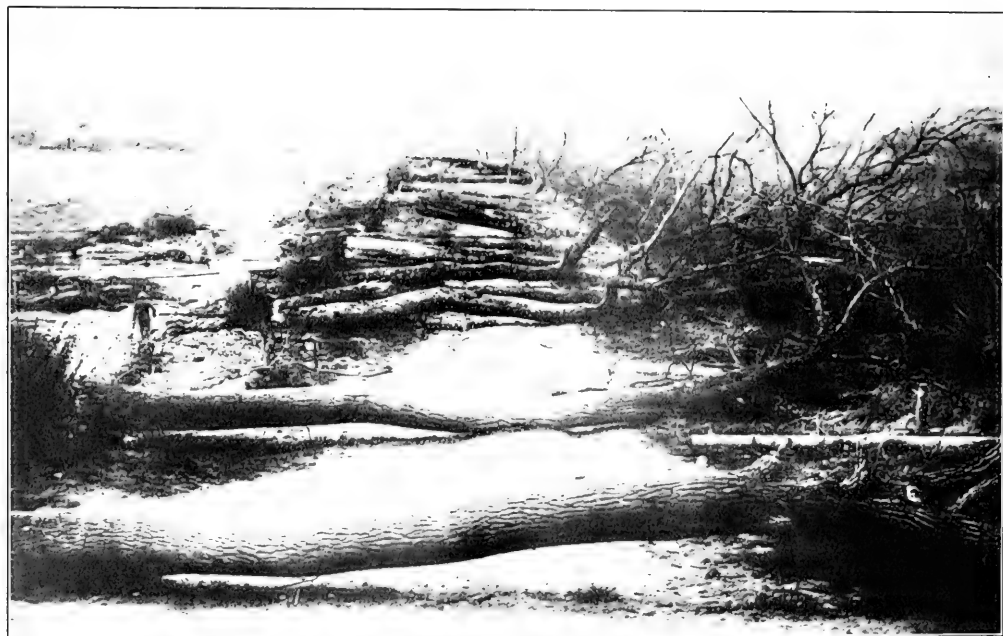
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Underwood and Underwood—*British Official Photograph*

WOODLAND ALONG THE ANCRE AFTER SEVERE SHELL-FIRE

Through what was left of these woods the British drove the Germans. The trees show the effect of shell and rifle fire of both armies. Few if any of those still standing escaped wounds from shell, shrapnel scrap, machine gun and rifle bullets. The whole woodland will have to be restored, but it first must be cleared of shattered trees, stumps and other debris.



Underwood and Underwood—*British Official Photograph*

ROAD BLOCKED BY FELLED TREES

Thousands of trees were cut down by the Germans to block roads as they retreated and this condition which hampered the British advance near Harrincourt shows how the fine trees which line so many of the roads through France were sacrificed. It will take scores of years to grow others to take their place.

AMERICAN FORESTRY

VOL. XXV

MARCH, 1919

NO. 303

FOREST CASUALTIES OF OUR ALLIES

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY

This is the first of a long series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France, and Belgium during December, 1918, and January and February, 1919. This trip was taken for the purpose of investigating the war time losses in the forests of these three countries and of ascertaining how best America can aid in restoring these forests.—EDITOR.

Paris, France, January 20, 1919.

THE Peace Conference is to determine how Germany shall supply France, Great Britain, Belgium, and Italy with lumber which these countries lost in the Great War; lost by the cutting of the forests by the Allied armies, the cutting for army requirements or the shipping to Germany for civilian uses by the Germans, and the destruction of the forests and woodlands by the shell, shrapnel and rifle fire of the contending armies.

This action will result in the replacement of actual losses of timber, but it will not restore the cut over and the devastated forests.

The restoration of these forests is the particular mission on

which the American Forestry Association sent the writer to Europe, a mission requiring an examination of the forests and woodlands, not only on the battle front, but also behind the fighting area and in Great Britain.

A series of articles on the forest conditions in France, Belgium, Great Britain, and Italy, and also on the work of America's forestry regiments will follow month by month. They will be well illustrated by photographs secured especially for the purpose.

As a result of the inquiries, which established most forcibly the need of reforestation, the American Forestry Association has undertaken the patriotic task of supplying France, Belgium, and Great Britain with a quantity of American forest tree seeds

which are to be used in the work of restoring the depleted forests of these three countries. This is an endeavor, gratefully accepted by the Europeans, which may be viewed as an appreciation by the lovers of forestry in America of the sacrifices which the Allied countries made in the vitally necessary task of supplying their armies; and which the ruthless enemy compelled in his lavish use of the forests not only for his army but for his civilians, and often, so it seems, for the purpose of barbaric destruction entirely unwarranted by military requirements. Do these countries need



Underwood and Underwood

ONCE A TREE SHADED ROAD

The path of desolation which remained after the German advance along the Amiens—St. Quentin Road where desperate fighting prevented them from reaching their object, the big supply station of the British at Amiens. Many of these trees were a hundred years old.

help in restoring their forests? It did not require a long examination to make a reply to this question. Belgium has lost practically all her forests. Fifty per cent of the timber and woodlands of England, Scotland, Wales

not only was able to supply army requirements but was able, by reason of her forests, to retain her liberty and save her national soul. Had it not been for the defensive value of the forests of northern France, which enabled

her to hold back the invaders, and for their offensive value, permitting the secret gathering of large bodies of troops for attack, France would early in the war have been overrun and defeated by the Germans. Her forests saved her and in this one respect alone she is more than amply paid for all her work and all her expenditures on them during the last one hundred and twenty-five years, the period for which a definite forestry system has been in force.

Can Germany Repay the Allies?

The ability of Germany to repay, in timber, the losses sustained by France,

and Ireland has gone, and every tree in Great Britain would have been cut had there been transportation for them to the sawmills, while France with great forest wealth and her forestry system highly developed, lost fully one-tenth of her forests. In the battle-scarred sections of northern France some million and a half acres of forest are today devastated and of little value except as fuel wood while large areas of her forests, governmental, communal and privately owned, have been cut over to supply the needs of the French, American, British, and Canadian armies.

France had not only to see her forests destroyed in the actual fighting and in the movement of armies, but had to supply her own army and those of her allies with wood for their numerous military needs. This had to be done because lumber could be more readily secured in France than anywhere else, and France, thanks to her splendidly developed system of forestry,

Great Britain and Belgium has been carefully studied by forest experts of these countries. The result of these



TRENCH AND UNDERGROWTH WHICH SHELTERED THE GERMANS

In Belleau wood near Chateau Thierry where Americans first aided in stopping the last great rush of the Germans the trenches and undergrowth and shell felled trees were over run by the valiant Americans and the Germans driven out after terrific fighting.



VIEW IN SHOT-SWEPT BELLEAU WOOD

A tangle of wrecked trees, matted undergrowth, massive rocks, wire entanglements and damaged trenches and machine gun nests are to be seen where the marines and other forces of the American Expeditionary Force scored a hard won victory over the Huns near Chateau Thierry. The writer in the lower right hand corner.

studies will be placed before the members of the Peace Conference as soon as the work, which is now under way, is completed. The information for the American delegates is being gathered under the direction of Colonel

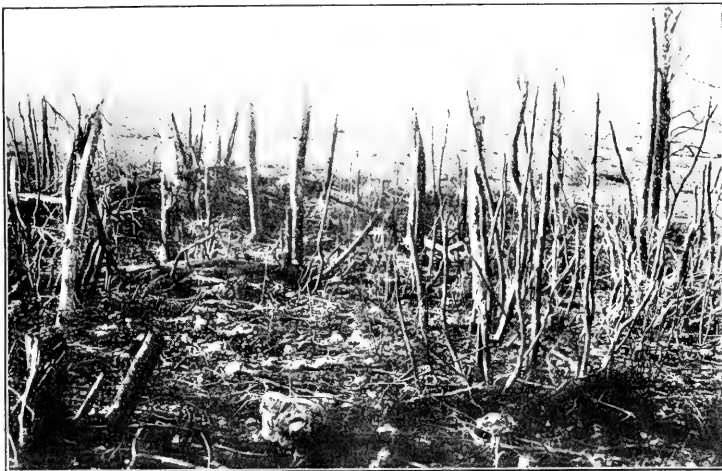
C. S. Chapman, of the Twentieth Engineers, who is also to make a report on the forest losses in France and Belgium.

One unofficial report just available as I am leaving Paris is that of Sous-Directeur G. Huffel, of l'Ecole Nationale des Eaux et Forêts, who says:

"Our French forests have terribly suffered from the war. The fellings made for the needs of the army, those made by the enemies with an incredible vandalism in the regions which he occupied—just the most wooded parts of the country—have impoverished or ruined them

for a long time. As regards the groups of timber located on the front lines, too often nothing remains of them.

"This situation is all the more alarming as our needs will certainly increase by enormous proportions. We have to rebuild our houses, our furniture, our machinery. Neither our own resources nor the resources of the world-wide market will be sufficient, by a great deal. It will then be necessary to have recourse to German forests, to take from them all timber we need and which Germany owes, because she ruined us. From the last



DESTROYED BY SHELL FIRE NEAR VERDUN

Such scenes as this are typical wherever there has been an intense bombardment of wooded areas in northern France. Only the skeletons of trees are left and these will rot, decay and fall in a few years.

ests, to take from them all timber we need and which Germany owes, because she ruined us. From the last



Underwood and Underwood

RESULT OF FIRE ON GERMAN DUGOUTS

The targets for the tremendous shell-fire which destroyed the trees in this narrow valley were the German dugouts, the remains of which may be seen on the farther side of the valley. So terrific was the bombardment that the dugouts were destroyed, the Germans driven out and not a tree remains alive.

official statistics, the total area of German forests (not including the forests of Alsace-Lorraine) is of 16,341,700 acres, of which 10,663,700 acres are State Forests, *i. e.*, forests belonging to various States, and 5,677,900 acres belonging to the Communes or to the Public Establishments. These forests are composed, above all, of resinous trees; Scotch Pine covers about half of the area (exactly 47 per cent), and Spruce the fourth part of the total area. Among deciduous trees, the Beech is by far the most widely distributed.

"Statistics show what are, for all classes of forests, the areas occupied by timber of different ages. Thus we can state that there exists, in the bulk of German forests, 7,867,000 acres of timber of more than 60 years of age, which may be used for carpenter's work, *i. e.*, as lumber. Half of this area is covered by Scotch Pine, more than the fourth part by Beech, and a little less than the fifth part by Spruce.

"If, not considering the bulk of German forests, we prefer only to consider forests belonging to different States, we find that Domaniales forests contain 4,032,000 acres of timber of more than 60 years of age. To this quantity may be added 63,950 acres of Communal Pine timber located in the Grand-Duche de Bade and in Wurtemberg. On this basis, it is easy to state what volume of lumber is immediately available, in the State forests. This volume is at least 338 millions of cubic meters. More than the third part is Scotch Pine which is excellent timber for lumber, the fourth part is Beech which can be used for lumber, and for railroad ties. Spruce and Fir will produce three millions of plain boards. Oak will also be welcomed by our cabinet-makers and carpenters who fear the lack of this raw material.

"The value in money of these 338 millions of cubic meters of standing timber will amount to 5,400,000,000 francs (\$1,000,000,000) if we take as a basis the sale prices realized during the last ten years in the bulk of German State forests. At the present rate, the value will be double and more, and perhaps triple. The material coming from the Communal Fir timber of the Grand-Duche de Bade and Wurtemberg, represents eight millions of cubic meters able to produce 250 millions of boards valued at the pre-war rate about 200,000,000 francs (\$36,700,000) on standing, and more than the triple at the actual rates.

"How many labor days will be necessary to market those 350 millions of cubic meters of timber, and how

many years will this work take? Is the world-wide market able to absorb without trouble this enormous quantity of products?

"The first thing to do is to forbid or at least to seriously regulate and reduce, during the period of realization of this material in State forests, any other felling of timber on the territory of the Empire, in order to reserve the forestry labor available in Germany. This point being agreed upon, it is easy to calculate that to fell and manufacture the



Undertwood and Undertwood

CONDITION AFTER A BATTLE

The destruction in this small patch of woodland was caused by an attack by the Germans on a British position. The Huns were driven back with heavy losses, but not before the concentrated fire from both sides cut the trees in the fighting area to pieces.

stock of lumber from German Public forests, 100 millions of labor days, plus the indigenous labor, will be necessary. To clean up this work in a year's time, this means to get 330,000 workmen, and this seems impracticable. If we prorate the felling for a period of five years, a body of 50,000 foreign woodsmen in connection with indigenous foresters, will be quite sufficient.

"There is no doubt that timber thus spread over the market could be easily absorbed.

"Before the war, in fact, France had to buy in foreign



Underwood and Underwood

AFTER BEING STRUCK BY A SHELL

A tree struck squarely by a shell as this was by a 75 m. shell is usually torn into splinters. This one stood near Vitry le Francois.

countries, five millions of cubic meters of lumber, and the United Kingdom bought more than fifteen millions of cubic meters. The latter received prodigious quantities of mine props furnished by our pine timber in the Landes. At the present time, the forests in the Landes will not be able to furnish any timber for a period of years. Furthermore, the export of timber from Russia, which supplied a large part of the needs of the British, will now be reduced or suppressed for a long time. Our Allies of the United Kingdom will then have to take for their own needs a large part of the enormous felling to be made in Germany.

"Besides we must consider that the Germans themselves, especially after we shall have issued orders to forbid any other felling that may interfere with our own operations, as mentioned above, could be authorized to receive part of the products of the felling in case some timber

would remain unnecessary for our allies and ourselves. Probably we would not refuse to cede them some timber, eventually, at a reasonable rate."

Forestry Losses in France

French soil having been the chief battle ground it is proper to first of all consider the forest conditions and plans for restoration of her forests.

The total area of the French forests situated in the fighting zones and in the regions which were long occupied by the enemy, or subject to his fire, has been estimated in round numbers at 1,482,600 acres.

The principal varieties of trees which make up these forests are as follows:

Among the deciduous trees: The Common Oak (*var. Quercus sessiliflora* and *Quercus pedunculata*), the Beech (*Fagus sylvatica*), the English Hornbeam (*Carpinus betulus*), the Ash (*Fraxinus excelsior*), the Elm (*Ulmus campestris*), the Birch (*Betula alba*), and the Alder tree (*Alnus glutinosa*).

Among the indeciduous trees: The Fir (*Abies pectinata*), the Norway Spruce (*Abies* or *Picea excelsa*), the Scotch Pine (*Pinus sylvestris*) and the Black Pine of Austria (*P. laricio Austriaca*).

These varieties are scattered very differently according to the regions. The deciduous trees predominate in the north of France (Departments of the North, of the Somme, of the Pas-de-Calais, of the Aisne, of the Oise, of the Ardennes, and of the Meuse). On the contrary in



Underwood and Underwood DAMAGED CAUSED BY ONE SHELL

One shell, a large one, struck this tree and the photograph shows its effect. Thousands of trees in all forested fighting areas were struck squarely during the storm of shell-fire and were destroyed in this manner.



Underwood and Underwood

FOREST VALUABLE FOR OFFENSIVE OPERATIONS

Three artillery pieces and one French artillery officer are to be seen in this heavily wooded section of the Argonne Forest, but so well camouflaged are the pieces that they are not visible at a short distance unless the observer knows just where to look for them. In woods such as these it is easy to conceal thousands of troops so well that the enemy airmen cannot discover them. One hundred and fifty-five pieces of artillery were concentrated at this place.

the East the fir and the spruce constitute the greater part of the woods in the mountainous part of the Department of the Vosges; and, in the chalky plains of the Champagne (Department of the Aube and of La Marne), the Austrian black pine is very common.

The principal forests belonging to the Government which are not in the regions in question are:

Mormal, 22,649,186 acres; Nieppe, 5,728 acres; St. Amand, 8,191 acres; St. Michel, 7,568 acres; Chateau-Regnault, 13,397 acres; Signy, 7,860 acres; Sedan, 9,496 acres; Moyeuve, 5,189 acres; Compiègne, 22,239 acres; Laigue, 9,439 acres; St. Gobain, 7,904 acres; Retz, 14,826 acres; Coucy-Basse, 5,322 acres; Lachalade, 5,436 acres; Spincourt, 5,189 acres; Lisle, 6,671 acres; Sommedieu, 4,942 acres; Les Elieux, 5,189 acres; Parroy, 6,424 acres; Bois-Sauvages, 5,310; Valde Senones, 10,331 acres; Rambervillers, 13,679 acres.

The forests belonging to Communes or to private individuals are:

Mazarin, 7,029 acres; Sauton, 5,169 acres; Boux, 17,222 acres; La Fague, 10,827 acres; Nouvion, 9,234 acres; Ban Lemonie, 11,633 acres; Valtin, 3,867 acres.

It is very difficult to estimate at present, with any accuracy, the area over which the forests in these regions have been devastated, the methodical and detailed examination of these ravages being still under way by the forestry department of the French Government, con-

sequently it is impossible to determine with precision the area on which the work of reforestation is to take place.

Moreover, independently of the wooded tracts which were more or less completely destroyed and which are to be totally or partially reforested, it is proper to take into consideration the agricultural lands which, having experienced a tremendous upheaval from artillery fire, mines, or works of defense will no longer be utilizable except through reforestation.

At all events it does not seem to be exaggerating to estimate at 741,300 acres the total of the lands on which work of reforestation will have to be undertaken, 494,200 acres of forest lands and 247,600 acres of agricultural lands having been ruined.

They will be reforested, as the case may be, either by planting or seeding. The nature of the land and its condition on the surface, the nature of the forest trees to be employed, and on the other hand the labor resources will involve the choice of one or the other of these methods.

It may be estimated that the area planted will be 444,780 acres and the area seeded 276,520 acres, which will necessitate, altogether, the use of 720,000,000 saplings and 1,851,864 pounds of seed of different varieties, or 72 million saplings and 185,186 pounds of seed per year, assuming a period of ten years as necessary for the execution of the work.

Native trees will naturally be utilized for the great majority of the forest areas to be created, and among them the oak, the beech, the ash, the fir, the spruce, and the Scotch pine will occupy a preponderating place.

It is certain, however, that France may use to advantage, in a certain measure, foreign varieties which have already proven successful in France, and this enabled the Administration of Waters and Forests to accept with gratitude the offer of the American Forestry Association to place at its disposal seed of American trees to help reconstruct the French forests.

If among these seed there are some, such as those of the Douglas fir and the Weymouth pine, to which France gives a very marked preference, it is owing to the following reasons:

The Douglas fir, *Pseudotsuga Douglasii*, known in France as the "Sapin de Douglas," was introduced there in 1826; and it has thus far proven there to be hardy under all conditions, the great cold of 1879-1880, 13° below zero, not having affected it. Placed in an environment which suits it, it prefers somewhat cool silicious soils, it grows rapidly and is capable of giving good yields. It is a variety destined to have an assured future in France as a forest tree. Fine masses of it are now

found in the center of the country, particularly in Sologne.

The Weymouth pine (*Pinus Strobus*), the Pine of Lord Weymouth, is of no less interest to France. Its introduction in Europe is very ancient, being said to have taken place in England toward 1705 through Lord Weymouth. Although of very great hardness and rapid growth, it spread at first very slowly on the old continent; but after about 50 years its use greatly developed. It was introduced advantageously in moist and even peaty soils, particularly those of the Vosges, where it gave exceedingly satisfactory results.

Cultivated on lands which suit it, that is, on cool soil which is of a silicious or clayey nature preferably, it grows with great vigor. It is a fully settled fact at present that this species is also capable of being employed successfully in France in the reforestation of certain lands.

France Accepts Help

Following a trip to the battlefields, principally those upon which the Americans fought, the writer had the pleasure of presenting to the French Government officials the offer of the American Forestry Association to provide France with American tree seed to reforest not only sections of devastated forest land but for use



Underwood and Underwood—British Official Photograph

A COMBINATION OF DESTRUCTION

The Huns not only destroyed by fire this fine old Chateau in the Flanders section of the battle front, but cut down all the fruit and ornamental trees surrounding it. Their explanation might be that of military necessity, but to the civilian it looks much like wanton destruction.



Underwood and Underwood—British Official Photograph

WRECK OF A WOODLAND NEAR LE BARQUE

Wherever trees were subjected to concentrated artillery fire the result was much the same as indicated by this photograph. Almost invariably some remained standing but all are so badly wounded that they will die.

on agricultural land so badly torn by shell fire that it is no longer of agricultural value. Such land may ultimately be restored for agricultural purposes after being planted as a forest for nature then may very gradually heal the scars of war.

At the conference held in the Ministry of Agriculture in Paris were M. Dabat, Directeur General des Eaux et Forêts au Ministère de l'Agriculture; M. Leddet, Conservateur des Eaux et Forêts au Ministère de l'Agriculture, Chef du bureau des reboisements; M. Eymeri, Conservateur des Eaux et Forêts au Ministère de l'Agriculture, chargé du service des exploitations forestières de guerre, representing the French Government; Major Theodore S. Woolsey, Jr., Chief of the Paris office of the forestry section of the American Expeditionary Forces; Capt. Maurice Fresson, liaison officer, and the writer.

M. Dabat with many expressions of gratitude accepted the offer and later in an official letter of acceptance, said:

"I am highly appreciative of the kind offer which you have made to me on behalf of the American Forestry Association and according to which the latter proposes to place at the disposal of the General Bureau of Waters and Forests considerable quantities of American forest seed to help replenish the French forests devastated by the events of the war.

"With deep gratitude do I accept the generous collaboration of your Society in this vast work which is so neces-

sary in order to restore the painful ruins accumulated on our soil as a result of the terrible war in which the American nation contributed so powerfully and so valiantly toward bringing to a glorious conclusion.

"I therefore have the honor to request you to express my sincere thanks to the American Forestry Association.

"The American forest seed capable of being used to advantage in the proposed reforestation are primarily those of the Douglas fir (*Pseudotsuga Douglasii*) or Oregon pine and of the Weymouth pine (*Pinus Strobus*), which have proved successful in our country and can be utilized there to a considerable extent.

"Besides them, we should be interested in receiving small quantities of the blue variety of Douglas (Colorado Douglas fir), of *Pinus monticola* (Western White pine), of *Pinus resinosa* (Red pine or Norway pine), of *Larix occidentalis* (Western Tamarack), and of *Picea Stichen-sis* (Tideland spruce), all being varieties whose use cannot really be rendered general until experiments have been made with them in nurseries or on small areas."

These facts, together with information about conditions in Great Britain, Belgium and Italy have been forwarded to the Board of Directors of the American Forestry Association, and are to be presented to the members of the Association. Later plans for the collection of the seed needed by the Allies will be considered and announced in the magazine.

THUNDER MOUNTAIN

BY HENRY S. GRAVES

CHIEF FORESTER, UNITED STATES FOREST SERVICE

IN THE high mountains of Central Idaho there is an area of over a million acres that tells the story of what would have happened in the western mountains if the National Forest system had not been established. It is an area of public land, rich in forest, mineral, water,



THE THUNDER MOUNTAIN REGION IS A VAST WATERSHED

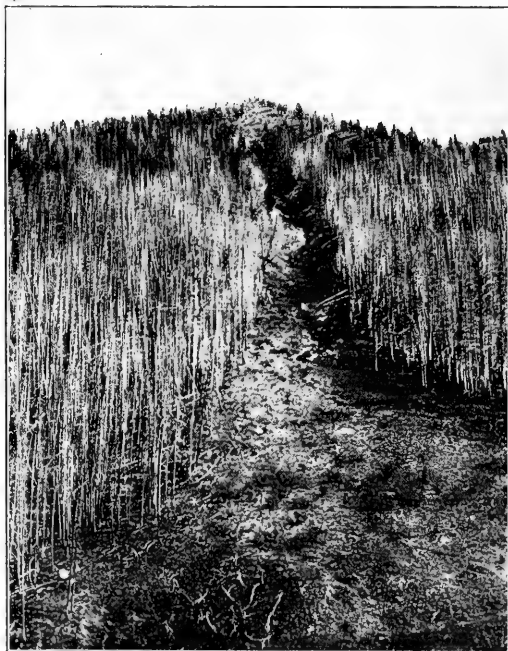
An important source at the headwaters of the Columbia River. The streams are swift, and there is an immense amount of potential water-power in the region.

and grazing resources, in which abuse by fire and over-grazing has wrought such havoc that the whole region is becoming a menace to both the local and the general public. It is surrounded by National Forests, in which for over twenty years there has been protection from fire, careful regulation of grazing, progressive development of trails and other improvements, and a foundation of industrial upbuilding and prosperity.

The Thunder Mountain country was not included within the National Forests because of local opposition. Within the area are valuable mineral deposits, and just prior to the establishment of the National Forests in Idaho there was a stampede of miners from all parts of the West into that region. Thousands of sanguine prospectors poured in, and mining camps sprang up as

if by magic. A beginning was made in building roads, trails, and bridges. Money was lavishly spent, merchants prospered mightily, and Idaho regarded the Thunder Mountain region as a future center of great industrial development. It was feared at that time by many people in Idaho that the existence of the National Forests might operate to retard mining development, and the public sentiment against including Thunder Mountain in a National Forest was so great that it was left as open public land unprotected and subject to the abuses of unregulated grazing of sheep.

The region now stands out in striking contrast to the surrounding National Forests. While in the Forests the resources have been saved and are being progressively developed, the Thunder Mountain region is being rapidly ruined, industrial development has practically stopped, and unless steps are taken at once to bring this



TIMBER OF ECONOMIC IMPORTANCE

The dense Lodgepole Pine makes an admirable soil cover. It also produces material of great importance in mining.

area under protection and control of the public, Idaho will not only have an unproductive waste but will suffer seriously through injury to an important water system.

The mining boom collapsed when the more available mineral pockets were exhausted, and when it became

apparent that permanent development could come only with the importation of large quantities of heavy machinery for the purpose of working deep mines.

have been burned. Timber with a potential value of at least a million dollars has been destroyed, and the process of attrition by fire is going on each year, so that in time, if present conditions continue, a great resource will have been wiped out. The region has become, too, a constant menace to the surrounding National Forests because of the danger that the fires, gaining headway under strong winds, may sweep over into the timber which the public is endeavoring to safeguard.



AN ABANDONED MINING CLAIM

In boom times the miner built his cabin at a point conveniently near his claim, living on in the hope that the country would be opened up. Most of them have abandoned the country, and development must wait until the area can be added to a National Forest and roads built to the mines.

There was required the construction of roads to make possible the opening up of the rich mining resources of the region. This was impracticable without Government aid, and the area was shut off from possible aid of the road funds appropriated for the improvement of the National Forests. Then the miners drifted away to newer points of interest, leaving deserted towns and prospect works as witness of the former mining activities. The region became almost depopulated. The old roads and trails which had been built have been largely washed out and destroyed. Forest fires, which in the early days were often set by prospectors to clear off the ground in order to make exploration more simple, destroyed millions of feet of timber. Lightning and carelessness also started many fires; and from year to year great areas were burned over, the fire rapidly destroying forests which were of great prospective value for lumber and for the needs of mining and other local development. Not less than 300,000 acres in this region

portance is the fact that the snowfall is heavy, normally remaining until late in the spring or early summer. The



A TOWN THAT IS NO MORE

The town of Roosevelt was a prosperous mining village, typifying the hope of the prospectors who in the early days rushed into the Thunder Mountain country. In 1907 the town was wiped out as the result of a landslide that dammed the river and flooded the valley.

mountains are broken and rugged and the slopes for the most part steep. While there are many rugged peaks and lofty ridges, most of the area is not above

timber line. In fact fully 85 per cent of the land originally was covered with forest of greater or less density.

The natural forest on this rugged mountain area is typical of the upland regions of central Idaho. In places there are even today fine stands of yellow pine and Douglas fir. It is not uncommon to see trees four or five feet in diameter. Along the streams one finds abundant Engelmann spruce, while the most common tree is the lodgepole pine, occurring in some places as dense pure stands and elsewhere in mixture with yellow pine, spruce, and Douglas fir. Then at the higher elevation, just as elsewhere in the Rocky Mountains, one encounters Alpine fir and white-bark pine. It was an admirable forest. It formed a protective cover for the steep slopes and narrow ravines and canyons, and safeguarded the regularity of the waterflow.

The region is one vast watershed. Innumerable streams distribute water in great quantities into the tributaries of the Columbia River. The supply of water is estimated at a minimum of approximately

power in excess of 100,000 horsepower, which ultimately can be generated.

The watershed is being ruined. This is partly through

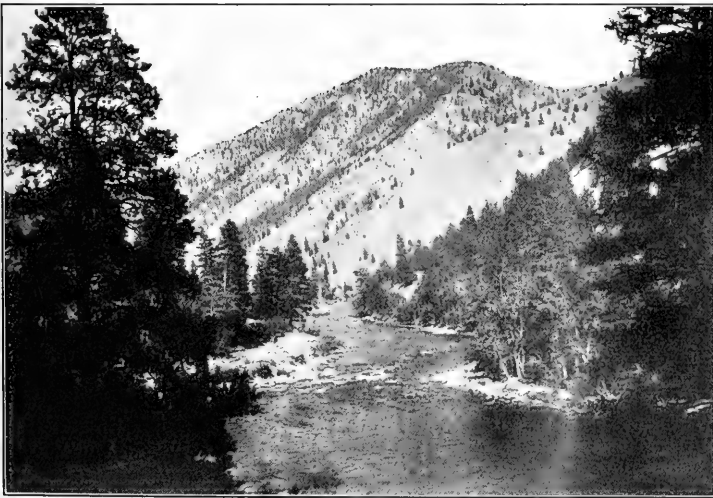


TREE GROWTH PERSISTS

Even the steepest slopes are capable of supporting trees. The character of the soil and steepness of the slopes make it essential that the slopes be protected by as much forest growth as possible.

the great destruction of the forests, with the inevitable effect on the rapidity of the melting of the snow in the

spring. More serious, however, is the injury to the ground surface by the excessive and utterly unregulated grazing of sheep. If this area had been under careful regulation, it might be possible to graze upon it as many as 75,000 head of sheep without injury to the watershed and without injury to the productiveness of the forest. Increasingly, stock men have been rushing sheep on this area, absolutely regardless of the effect of the over-grazing on the forest range itself or upon the watershed. During the past season it is estimated that there were about 300,000 sheep ranged on the area. Not only is this overgrazing destroying the better grasses, but the soil is being rapidly washed away. Gullies are being cut that already are from one to two feet deep and



SLOPE RISING ABRUPTLY ABOVE A STREAM

These slopes today are being burned over by forest fires. Over-grazing by sheep is already starting myriads of gullies which promise to have a serious effect on the stability of the waterflow.

1,000 second feet. Many of the streams have a rapid flow, averaging about 100 feet to the mile, and it has been estimated by some that there is potential water-

which with every flood are being scoured out to a greater width and depth. Portions of the area are described by forest officers as practically a dust heap. It is said that

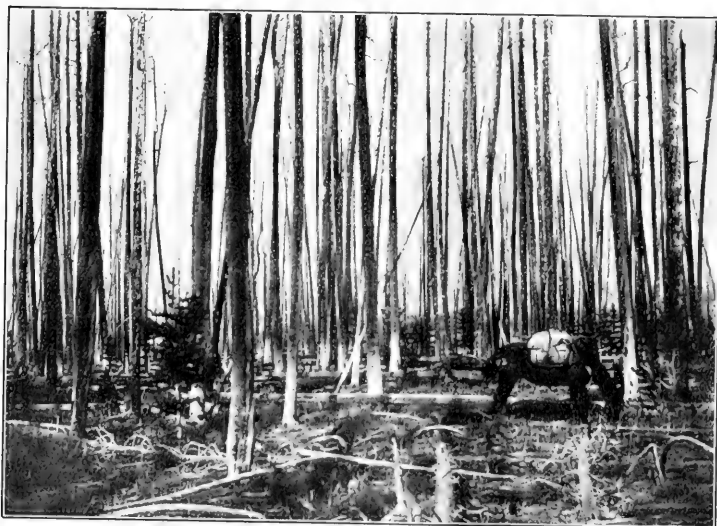
the southern end of the area is so devoid of forage suitable for horses that practically nothing can live there except sheep and that during the past season the sheep themselves were forced to eat grasses and plants that they are never known to eat except in extreme cases. The actual effect of the destruction of the timber and of the overgrazing is already noticeable. On one important stream the high water period is at least one month earlier than on streams in the National Forests, under precisely similar conditions, where the watersheds are protected.

It is not yet too late to save the Thunder Mountain country and to make it a source of wealth and general public benefit to the State of Idaho and to the country. There is still upon this great area an aggregate of between two and three billion feet of timber; and while the timber is comparatively much less accessible than a great deal of other timber owned by the public and by private individuals, it will nevertheless ultimately be of great importance. Its destruction would be a calamity. When the National Forests were put under administration there were other areas which had been greatly overgrazed. The placing of the Thunder Mountain region under strict grazing regulations would make it possible within a few years to begin the restoration of the natural grass cover, which, together with the forest, is indispensable to the protection of the watershed. The development of the great mineral resources of this region is hopelessly blocked until the area is incorporated into a National Forest system so that roads can be built. The protection of the forests, the regulation of the grazing, and the building of trails and other improvements would set in motion a progressive development of the region



PICTURESQUE WHITE-BARK PINE

The white-bark pine grows on precipitous slopes and is of value in holding the soil. It often assumes a most picturesque form.



FIRE SWEEPED AREA

Fully 300,000 acres of forest has been burned and the public has lost timber having an approximate value of not less than a million dollars. The dead trees stand for a time after a fire, then are blown down and furnish fuel for additional fires, which finally wipe out all tree growth.

in contrast to the present progressive devastation.

There is but little land suited to agriculture. There are a few farm homesteads, but so far it has been possible for homesteaders to clear and put into cultivation only slightly over 400 acres. It is believed by careful observers that there is probably not more than an aggregate of 4,000 to 5,000 acres which could be farmed. These lands occur in scattered patches. It is certain that there will be little development of them until the mines and other resources can be opened up in such a way as is possible under the National Forest system.

Not to be overlooked among the resources is the wild life which abounds in this region. Game is plentiful and there are reported to be many mountain

sheep and goats. Certainly no better fishing could be found anywhere.

Adverse public sentiment was responsible in the early days for excluding this area from the National Forests, and hence for the serious condition which has followed. Public sentiment has changed. There is now a demand among the people of Idaho that this area be made into a National Forest. The present sentiment in Idaho is well expressed by a resolution passed by the State Legislature in 1917, in which there was only one dissenting vote in each of the two Houses. The sense of the Legislature regarding the value of making this

resources for the benefit of the local residents and taxpayers; make it possible for the State to realize upon its equity in the lands by relinquishing the unsurveyed school lands (Sections 16 and 36) and selecting more valuable lands elsewhere; increase the revenues of the county and State through the receipt of 35 per cent of the gross receipts collected by the Forest Service; enlarge the power of the State to share in the benefits of the Federal aid road act; and otherwise assist in opening to development and use the vast material resources of the Thunder Mountain region."

It was affirmatively recommended in the last annual



A MOUNTAIN MEADOW

Typical scene in a mountain meadow, backed by ridges, covered with forest. This picture was taken fifteen years ago. Since then hundreds of fires have been depleting the forest resources of this region.

area a National Forest is expressed in one of the clauses of the preamble as follows:

"The inclusion of the said area within a National Forest would eliminate the annual destruction of timber by forest fires; make it possible for homestead settlers to secure title to their lands under the forest homestead act of June 11, 1906, without expense to them other than entry and final proof fees and without the necessity of awaiting public land surveys; would bring Federal aid in the construction of wagon roads, trails, bridges and telephone lines; give adequate protection to the game animals, birds and fish; establish a system of regulated range use, thus conserving and perpetuating the forage

report of the Forester that this area be comprised within the National Forest system. It would not be a great financial burden to the Nation because it would be possible to deprive from it immediately a certain revenue through the fees for grazing the number of stock which could be permitted even under present conditions, and this would go far to cover administrative costs. A great mistake was made in the first place. The consequences of that mistake are already serious. It is essential that the public take action immediately to prevent further injury and to make the area in question of public service rather than increasingly a public injury.

KILN DRYING OAK FOR VEHICLES

ONE of the distinct developments of experiments conducted at the Forest Products Laboratory at Madison, Wisconsin, during the war was a rapid method of seasoning oak.

It requires from two to three years to air season heavier oak wagon stock. Better stock has been secured by drying this heavy green oak according to Forest Service recommendations and the time for 3-inch material green from the saw is reduced to 90 or 100 days.

Three large plants using this system have negligible

losses and as compared with losses at plants using other methods, ranged from 10 per cent up to complete loss. Where there were heavy drying losses there was heavy pressure for relaxation in inspection, so that poor drying meant not only an excessive loss of stock and a holding up on deliveries but probably also poorer material in wagons.

One furniture plant with orders for spare parts that followed improper drying methods is reported to have lost \$25,000 worth of stock on one run, stock which was being depended upon to keep the force at work.



Photograph by Harris and Ewing

BEAUTIFUL TREES SURROUND THE UNITED STATES CAPITOL.

Though markers and monuments of bronze and stone will doubtless be erected in many places to our heroic dead—our boys who fought and bled that Justice, Truth and Liberty might prevail in every land, they will not be all. A more significant meaning is found in the planting of Memorial Trees, standing as constant reminders to the people of America of that love of freedom, light and life for which our soldiers offered their service and their lives. And again such trees may well supplement the marble arch or monument, furnishing the needed artistic setting, a point well demonstrated by this picture of the trees around our National Capitol at Washington.

MEMORIAL TREES PLANTED FOR SOLDIERS AND SAILORS

WHATEVER memorial is erected to honor the American soldiers and sailors who gave their lives for liberty, should be, in every sense, worthy of the deeds they performed. This means, for one thing, that it should be of lasting value, just as the results of the victory they won will be an enduring blessing to the human race. It means, in the next place, that there should be about this memorial a lofty and sentimental appeal, in keeping with the principles of Justice, Truth and Liberty for which these men fought and died.

In the third place, the memorial should be a living, growing monument which will increase in strength and meaning with the passing of the years and with the growing power of democracy.

What more fitting tribute, then, to America's heroes than groups and rows of trees and individual trees in their home communities. They can be planted along the streets and avenues and highways, in parks and plazas, church yards and school grounds and in other places. They will stand as a constant expression to the people of America of the love of freedom, light and life for which our soldiers offered their lives and their services. As they grow and expand, with their branches reaching upward toward heaven, they will speak daily of the growing and expanding life which they protect. Whatever other forms of memorial are decided on, therefore, nothing can

be more appropriate than tree planting. This is true for a number of reasons. Trees are a protection to life and innumerable are the uses to which man puts wood, ranging from the ships which cross the ocean to the house he builds over his head.

Widespread approval has been voiced of the suggestion put forth by the American Forestry Association that cities, states and communities, no matter what other memorials are erected, adopt the setting out of trees, in commemoration of those sons of whom they are so

proud. And this honor should not be confined to those who paid the supreme sacrifice. It should be made to include as far as possible all those who entered the service of their country and who stood ready to back to the limit the cause of the United States and its Allies, Governors of many states and numerous other officials, civic bodies of various kinds, women's clubs and others have expressed themselves as in hearty accord with the idea, and this backing may be counted on to push through any plans in this direction which are worked out.

Markers and monuments of bronze and stone doubtless will be erected in many places. This will not prevent the carrying out of the tree-planting idea. In most cases trees will serve as an artistic and needed setting to be used in conjunction with some other memorial. If an arch or building is erected, trees can be arranged



Photograph by Drew-Bynum-Peters

PLANT MEMORIAL TREES FOR THREE WHO DIED IN SERVICE

Three memorial trees were dedicated Sunday afternoon at 2.30 o'clock in front of the first city playground in South Canal Street, Newark, in memory of three young men who died in the service. The three thus honored were: James V. Marzano and Oscar Sager, who made the supreme sacrifice on the battle-front, and Frederick Sauchelli, who died in the navy. The three trees bore memorial wreaths and other decorations. Mayor Gillen delivered the dedication. The exercises were under the direction of Director Joseph Esposito, who sent invitations to young men in the service, home on furlough, to assist. Music was furnished by the Police Band. (From the Call, Newark, New Jersey.)

at appropriate distances around it or used along avenues and roads leading to it.

It seems, however, as if the service and the sacrifice of America's sons in this great war call for something more significant, something different from the customary



A LIVING, GROWING MEMORIAL

Walnut trees will not only furnish shade and add to the beauty of the landscape and the nation's future timber supply but to its food resources also. Planted individually along roadsides or elsewhere, or in groves, they will stand as perennial reminders of the full measure of service paid by America's sons who fell in France.

marble and bronze. There are many reasons why trees are most appropriate memorials for these men. It was the trees of France which played a large part in helping to hold and finally drive back the Hunnish hordes. France sacrificed her forests, as she did her sons, that right and justice might prevail. In this connection both the sentimental and the practical value of tree planting must be recognized, for it is helping to make up for the awful losses of devastation at the same time that it is a living, growing memorial.

It was due to the careful planting and conservation which had been practiced by the French for many years previous to the war that, when the time came, her forests were able to supply the vast quantities of wood which was needed by the Allies for a thousand purposes. This should be a great lesson to the United States. Its forests constitute one of its greatest sources of wealth and depletion must be overcome by new planting.

The practical patriotism which is exemplified in the planting of trees as memorials is emphasized by the suggestion of Agnes Mildred Brennen, of Niagara Falls, New York, who voices the opinion that nut trees be grown, thus combining food value with that of shade, artistic beauty and future timber supply. In this connection she says:

"During the last four years more people of Europe have died of starvation than were killed in the war. We were called upon to feed the Allies, and this meant conservation of all food products. Now that peace is at

hand we are not held strictly to a limited amount of any one commodity, but we are not morally released from conserving. Europe must be fed and it is plainly our duty to furnish the food; not for a year or two but until that time when she will be able to raise her own food. The motto of the Hun was, 'Destroy Everything' and this he did most ruthlessly. We then, must adopt for our slogan the motto of the war kitchens, 'Save Everything.' We must now have our Victory Gardens and make every available piece of ground work for the cause of democracy.

"The number of our native nut trees has diminished during the past few years, while the quantity of nuts consumed has steadily increased. The war has laid waste the nut orchards of France and Italy and we can no longer import from these countries. Why then, when planting trees in commemoration of the deeds of our heroes, would it not be wise to plant a goodly number of those trees which will not only serve as a fitting memorial to our honored dead, but also furnish food for



THE BITTERNUT HICKORY

This beautiful tree grows throughout the United States all the way from the Canadian border to Florida. It is one of a number of varieties according to the American Forestry Association there are no hickories growing in a state of nature outside of North America.

suffering humanity? It is unnecessary to elucidate upon the value of nuts as food, which well understood by the majority of people and is constantly becoming recognized by the people in general. Most nut trees require less care than ordinary fruit trees and are longer lived.

"When you plant another tree, why not plant an English Walnut Tree?" Luther Burbank says, then besides sentiment and shade and leaves, you have a perennial supply of nuts, the improved kind of which furnish the most delicious, nutritious and healthful food which has ever been known."

The oak, "symbol of strength," is suggested by the North Carolina Geological and Economic Survey, which in a statement commenting on the memorial tree plan says:

"What more fitting memorials

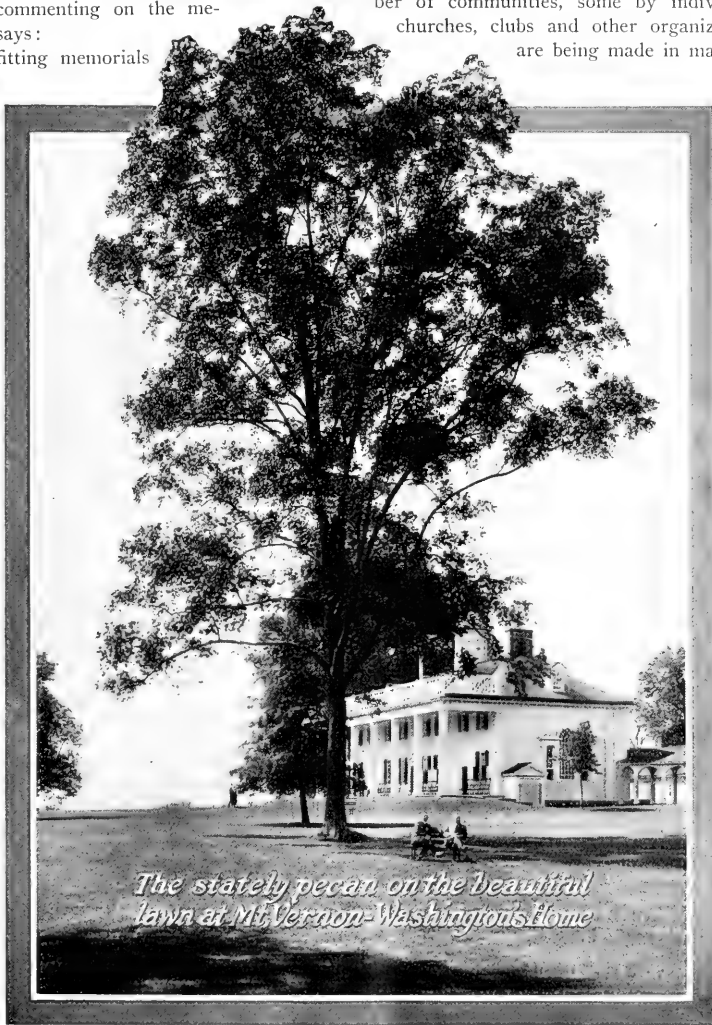
could there be than trees! Not monuments in stone, never changing, indifferent alike to the seasons, and the care of loving hands; but beautiful young trees, growing ever upward and outward toward the light, like the souls of those whom we seek to commemorate and responding daily to the care bestowed upon them.

"The ideal tree for this purpose is one that will thrive in most situations, is resistant to disease, will live long, is beautiful in youth and will be still more beautiful in age. Such is our American white oak. It grows slowly, but no tree arouses such genuine admiration, affection and inspiration. Some other oaks, such as the willow oak, red oak, pin oak, live oak, and others are ideal for the different parts of North Carolina in which they are native, but the white oak thrives all over this State and in fact over practically all the eastern United States.

"Let us plant oaks, the symbol of strength—and one might almost say of immortality—as memorial trees, not only singly on school or home grounds, but in parks and more particularly in avenues along our important roads, making our ways beautiful with their living beauty and keeping alive the sacred memories of those whom we love and shall always delight to honor."

Memorial trees already have been planted in a number of communities, some by individuals, others by churches, clubs and other organizations; and plans are being made in many other places to

follow out the American Forestry Association's suggestion. It is most gratifying to note the prompt and wide response to the idea. A number of the states through their forest or their highway commissions are furthering the movement in a big way and preparing to plant entire forests, groves in the various counties and thousands of trees along the main roads. In co-operation with the American Institute of Architects, Portland, Oregon, is working out a comprehensive victory memorial project which includes beautiful parks with trees, a Liberty Temple, memorial hospital



The stately pecan on the beautiful lawn at Mt. Vernon—Washington's Home

Courtesy of the Maryland Nut Nurseries

and a broad central driveway, with trees on either side and smaller roadways, leading to the State Capital, with wooded parking in other portions of the scheme.

The plan outlined for St. Louis by the local chapter of the American Institute of Architects provides for a cross-town park system, with Chateau Thierry and St.

Mihiel Parkways, Wilson, Pershing and Lafayette Circles, connecting with existing parks and making a comprehensive municipal improvement feature. It is suggested that one of the parkways be named "Argonne Forest," while a connecting plaza be named "Avenue of the 138th" in honor of the St. Louis National Guard Regiment which was in France.

Atlanta, Georgia, has selected April 6th, the anniversary of this country's entrance into the war, as the date for the planting there of trees in honor of the heroes of that city and Fulton County. The War Mothers of Atlanta have arranged for this dedication. The Atlanta Writers' Club has planned to set out a grove of trees in honor of prominent Georgia authors; and the first to be so honored is Jacques Futrelle, who was lost on the Titanic.

ing to the Association on this subject, George Bird Grinnell, of New York, approves of the idea for a memorial park or parks in Colonel Roosevelt's honor, as well as of the plan for memorial trees for soldiers and sailors.

The Pittsburgh Chamber of Commerce has adopted the idea of planting trees there for Alleghany County's soldiers and sailors who died in the war. The Elyria (Ohio) Rotary Club has decided to plant maples along the drives in the Memorial Hospital grounds, one for each native son who was killed. John Poole, president of the International Association of Rotary Clubs, speaks of the memorial trees as "living and loving tributes" to the memory of America's heroes. In Fort Wayne, Indiana, the department of public parks has purchased 150 trees for a memorial park.



Photographs by courtesy of D. N. Pomroy

THE END OF A PERFECT DAY

Beauty and the Beast have been busy filling up the baskets and sacks with walnuts and they seem to have made a very successful haul. While "Maed" will not share in the feast, there are enough of the delicious, nutritious nuts for many children to enjoy along with the little lady shown in the picture. When planting trees in honor of the nation's heroes who served or who fell in the great war, why not set out walnuts or some other equally valuable food-producing tree which will combine a practical with a sentimental value?

The tree planting day which is to be observed this spring by the Sharon Community Center, of Farmington, Iowa, is to be known as "Roosevelt Day." Thus, at the suggestion of the American Forestry Association, the man who occupied such a prominent position for having made conservation a live issue in the United States, is to be paid a tribute which would have appealed most strongly to his nature-loving heart. In many places throughout the country they are planning to honor Colonel Roosevelt's memory by tree planting. In writ-

An American elm for every Ramsey County, Minnesota, son who paid the supreme sacrifice, is to be planted in Linwood Park, St. Paul. Worcester, Massachusetts, is considering the placing of a row of trees along Green Hill Park Driveway leading out to Camp Bartlett, where the boys from that city trained in the early days of the war. Clinton, Massachusetts, is planning a park of trees in the heart of the city. At Fort Worth, Texas, the men who trained at Camp Bowie are to be remembered by trees along two avenues leading

out to the camp. The City Federation of Women's Clubs is back of this movement. There has been introduced into the legislature of South Carolina a bill providing for a park of not less than fifty acres at Columbia, the State Capital, set with appropriate trees and with a memorial hall in the center. At Metuchen, New Jersey, the board of education planted a Douglas spruce in the school grounds to keep green the memory of that town's sons who served.

Mrs. William T. Igleheart reports from Evansville, Indiana, that they are planning to make the tree planting day there "a victory occasion."

And in Collamer, Indiana, the *whole* town helped in

mony. Everyone—young and old, after the tree had been set in place, took one of the spades and deposited some dirt around the roots. The spades which were borne by a Boy Scout and a Camp Fire girl were decorated with small American flags.

The first part of the services were held in the village school. There a report was made on each individual soldier from Collamer, as to the time he entered the service, his duties, location at that time and anything he might have said about the service and his home while away. This recital was made by some member of his family, father or mother, brother or sister, or by a friend. There was also a short dedicatory address by



THE MEMORIAL TREE PLANTING AT COLLAMER

The town of Collamer, Indiana, with 200 inhabitants planting a tree in honor of its eighteen sons who served in the war. Recital of the service of each man was made by some relative or friend. A Boy Scout and a Camp Fire Girl each had a spade with which each person present threw some dirt around the roots. The man inside the fence (side view) is A. R. Fleck, County Superintendent of Schools; the man next to the Boy Scout is Rev. Cyrus Fleck and woman at extreme left in front of the woman with baby in arms is Mrs. Oca Jellison, Principal of the school.

the planting of memorial trees. If the service had been held in a great cathedral or if there had been 100,000 people present, it could not have been more impressive and more patriotic in character than when the two hundred inhabitants of Collamer, Indiana, gathered to do honor to the eighteen sons of that town who were serving in the great war.

The tree planting, reported by M. L. Galbreath to AMERICAN FORESTRY, was in many ways unique and of permanent record. Collamer is in the home county of Vice-President Marshall.

Every person present took an active part in the cere-

A. R. Fleck, county superintendent, explanatory remarks by Mrs. Oca Jellison, principal of the school whose husband was then in action in France, and prayer by Rev. Cyrus Fleck. Then the audience marched outside and formed a hollow square around the fence inside of which the tree had been placed and as each one passed inside he or she took one of the spades and placed a spadeful of dirt around the tree. Prayer and the singing of America closed the exercises.

Through memorial trees growing in their honor America's worthy sons will live again through the years to come.

IN THE FURROWS OF FREEDOM

BY CHARLES LATHROP PACK

PRESIDENT, NATIONAL WAR GARDEN COMMISSION

ANATION is as strong as its homes. The purposes of the various community efforts, which today are occupying the thought of many leaders in civic betterment work, is to knit together and make more secure the home ties.

The greatest of all community efforts is that of home food production. The garden is the cement which helps to hold in place the foundation of the home. There is scarcely a city or a town in the United States where the question of bringing the producer and the consumer closer together has not been discussed and where some sort of

plan has not been devised for bringing this about. But the method which has accomplished the most and which has proved most successful is that of the home and community garden. No other instruments have been found so helpful to the individual, the unit of community life.

"We Americans ought to be a nation of gardeners," says W. E. Babb, a Chicago newspaper man and apartment-house "cliff-dweller" who cultivated a garden last year for the first time in his life and found it not only profitable from an economic point of view but interesting and educational as well. "Nature intended that we should be a nation of

gardeners," he adds, "and this applies to the man in the city as well as to the rural districts."

He tells how after clearing all the "weeds, tin cans and brick-bats from the vacant lot which he 'borrowed,' and

digging up a carload of junk," he succeeded in raising "enough to supply a score of people with vegetables all summer, while in addition my wife canned a lot for winter use."

"And there was something more," he declares. "I learned that vegetables are interesting things to live with. I tried raising chickens once and got a lot of real pleasure out

of it but it didn't compare with the joy and knowledge I got out of my war garden." He was awarded the first

prize by the State Council of Defense for his war garden.

Many thousands of other people have learned that war gardening is not only valuable but interesting. City officials and business men have learned that it is a movement worth cultivating permanently. That is why, in addition to their knowledge of the present world need for food, they are backing the Victory Garden campaign this year. The community

with the largest number of gardens in proportion to its population, other things being equal, is the most pros-

THE DAYLIGHT SAVING LAW

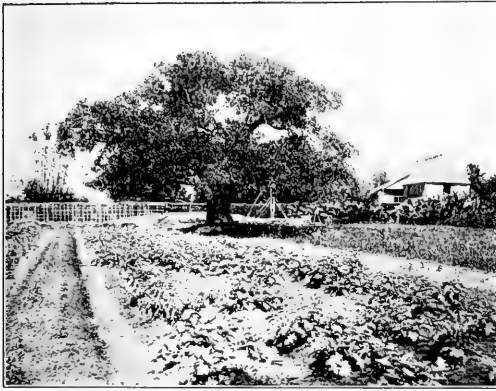
Here is the Daylight Saving Law which was in effect in 1918 and will remain in force during 1919, and which will settle the minds of doubters as to whether daylight saving is a one-year proposition or not:

"That at 2 o'clock ante-meridian of the last Sunday in March of each year the standard time of each zone shall be advanced one hour, and at 2 o'clock ante-meridian of the last Sunday in October each year the standard time of each zone shall, by the retarding one, be returned to the astronomical time of the degree of longitude governing each zone, respectively."



CABBAGES AND KINGS

When a factory worker has a garden like this with the best of vegetables right at the kitchen door he can feel as independent as an American citizen should feel. This is a corner in the one-acre garden of an employe of Eastman Kodak Company at Rochester, New York.



Photograph, Bureau of Agriculture, Philippine Islands
EGGPLANT AND LOMBOY

This is one corner of a vegetable garden at Singalong, Manila, where the home food production campaign has borne fruit.

community welfare schemes. This includes the planting of gardens. All these forces realize the binding strength of the home. Love of home reflects love of country and inspires the spirit that produces real patriotism. Lincoln said: "Let not him who is homeless pull down the house of another, but let him labor diligently to build one for himself."

America, the land of homes; America, the land of gardens! That is a "consummation devoutly to be wished," a goal worth striving for. The nearer we come to that aim, the richer in things spiritual as well as physical will be the nation.

Large industrial concerns which have encouraged and assisted their employees to plant gardens and to raise part of their own food testify to the value of the work as a stabilizer of labor and as making more contented and better workmen and citizens. The National War Garden Commission has received numerous reports which bear out this statement. Here, for instance, is what is said



WAR GARDEN WHERE FIRST ALFALFA IN UNITED STATES WAS GROWN

Lorenzo S. Clark, of Salt Lake City, answered the call of Pershing to "Keep the Food Coming" by planting a war garden on land where his father, in 1853, with seeds brought from England, planted the first alfalfa in this country. Under the direction of Walter J. Sloan, supervisor of city war gardens, Salt Lake City in 1918 planted more than 8,000 home food producing plots and raised \$750,000 worth of its own food. Mr. Sloan reports to the National War Garden Commission that they are planning for an even bigger campaign for Victory Gardens in 1919. He says: "There will be need for an additional food supply for years. The people of the United States, at least a majority of them, are just beginning to learn what it means to raise their own vegetables. I believe that it would be to their benefit, war or no war, if we could instill into the minds of the American people this thought—No unsightly back yards, no vacant lots. Weeds are a menace to health, so are empty cans and garbage in your back yard. We want health."

perous and the best community. One has only to look at value figures of what some of the cities raised last year, running into many thousands and in numerous cases into the hundreds of thousands of dollars, to realize what this movement means.

Closely connected with this home food production effort is the big "own-a-home" campaign which is being conducted this year throughout the nation. This is being stimulated by the United States Department of Labor, the National Federation of Construction Industries, real estate boards and chambers of commerce and various other organizations which have at heart the lasting betterment of the people. The Council of National Defense is now utilizing the vast machinery which it built up to help organize the nation for the pressing business of war, and turning it into the channels of peace and working out



A COMMUNITY GARDEN GROUP

Here are a few of the thousands of home food producers of Louisville, Kentucky, who have made a wonderful record.

of the movement by the Norton Company of Worcester, Massachusetts, whose employes last year cultivated 100 acres of company land on which they raised between \$40,000 and \$50,000 worth of food, in addition to that which more than 2,000 workers grew in their home gardens:

"The Norton Community Shop gardening activities are no longer an experiment. On the contrary they are

an unqualified success, and the Norton Agricultural Society is looked upon by the company and its employes as a permanent institution. Many who have never handled the spading fork and the hoe are becoming enthusiastic amateur gardeners. Far from turning a good workman into a poor farmer, one of the most important results of the Norton garden activities has been the making of good workmen into better workmen. The procession of men who at the end of a summer afternoon in the shop tramp over the hill to enjoy an hour of vigorous exercise out of doors is matched the following morning

by the returning ranks of clear-eyed, vigorous men ready to engage with equal enthusiasm in the regular vocational work which they have chosen. The harvest time, which brings to the man the tangible evidence of what intelligent effort, persistence and industry will produce in the garden, gives him a clear realization that the exercise of the same qualities in the shop is as certain to bring its reward.

Better still, as the officers of the company and its men busy themselves in their gardens side by side, there arises the spirit of comradeship among all who embark together on some great adventure."

This idea is spreading around the world and other nations are coming to the United States to learn of the benefits which have come to this country as a result of the community and shop garden movement. The inhabitants of the Philippines have entered into this work with an enthusiastic determination to improve their own condition at the same time that they are performing a broad



LOOK WHAT TRENTON DID

Some of the finest war gardens in the United States were in the capital of New Jersey, where the Trenton Food Garden Commission was active in keeping up interest in home food growing. Is this not a wonderful improvement on an ash-covered lot?

community and shop garden movement. The inhabitants of the Philippines have entered into this work with an enthusiastic determination to improve their own condition at the same time that they are performing a broad



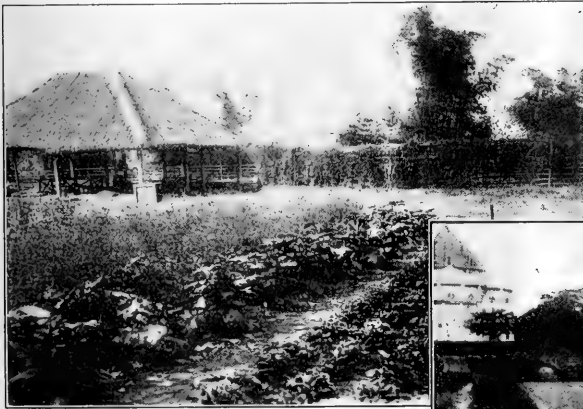
GAVE UP GOLF FOR GARDENING

That is what W. F. Nemits, assistant general claims agent of the Chicago Surface Lines, did when he saw the need of raising food for the boys "over there." His report to the National War Garden Commission of Washington shows that although he had never done any gardening before he made a fine record. Individuals and communities everywhere are planning to make the Victory Garden Campaign this year a bigger success than was the war garden campaign last year.

humanitarian service. A report to the National War Garden Commission from the Secretary of Agriculture of the Philippines tells something of the way in which they are planting gardens there. This work has been well-organized and is being stimulated through district and municipal campaigns so that everybody is reached and encouraged to help in the food production effort. Demonstration gardens are being planted throughout the Island in the public squares and plazas of the different municipalities to serve as a standing call to the Filipino peoples to help in the world food war. The instance is cited of a fourth grade school boy in one of the islands in the Philippines who has taught a big lesson in food production to the natives of the whole island. He entered the contest which was held there and was given a

but it is because of the beautiful flowers and landscape effects for which they are famous not because of the vegetables which they grow.

The Victory Garden campaign in the United States this year is in full swing and, in the widespread interest shown and the number of gardens planted, bids fair to surpass the wonderful work done in 1918. Hundreds of organizations which were active in the movement last year are again in the field, while new ones are taking up the slogan of "Food F. O. B. the Kitchen Door," and urging everybody to get into the furrows of freedom to drive back the new enemy, General Hunger. Manufacturing concerns have prepared to assist their employes again this year by providing land for them to cultivate. There is increased interest among railroad employes in the work. State and city officials and garden committees are busy. Banks and libraries will assist again by the distribution to their patrons of thousands of garden books furnished them by the Commission. The newspapers of the country again are backing the movement and lending it their hearty support. Big campaigns are on in many cities and motion pictures are being used to show what the "city farmers"



WHAT THEY'RE DOING IN THE PHILIPPINES

Lettuce and eggplant are some of the specialties they raise in their gardens at Singalong, Manila.

small piece of land to cultivate. On it he raised a variety of vegetables. He was told, however, that it would not be possible for him to grow a second crop of corn, as it never had been done, and that the weather and other conditions would not permit. But he did grow a second crop of corn and it was larger than his first crop. In this way he converted the sceptics to the possibility and the value of rotation.

The Japanese Government is studying the methods which have been carried out successfully in this country by the National War Garden Commission. S. S. Honda, trade commissioner of Japan and an official in the Department of Agriculture, who was recently in the United States, took back with him to Japan all the information he could gather about home and community food production, with the purpose of organizing a similar campaign in his country. In discussing the subject he said that a survey of idle land was then being made and that his people, who knew virtually nothing about home gardening, would be urged to cultivate all the land available. Japan, of course, prides itself upon its gardens, he said,



Photographs, Bureau of Agriculture, Philippine Islands
AT CALLE TAFT, MANILA

Everybody is a victory gardener in the Philippines and they are rounding up the "slack land" even under the shadow of the cathedral dome.

can do. As an illustration of what they are doing in some of the cities, here is what C. E. Smith, garden director of the Detroit Department of Parks and Boulevards, says in a letter to the Commission:

"The work for the present year is well on its way and we are anticipating a much bigger and better work than the year previous. With a large number of gardeners already enrolled with us and the present amount of available land for garden purposes more than double that of last year, we feel assured that the victory gardening for this year will be well worth the most strenuous efforts." In Detroit they are using the Commission's posters on the street cars, particularly to call the attention of the factory workers to the need of home food produc-

tion. Advertising clubs are assisting and here is the text of a resolution adopted at a recent meeting of the Advertising Club of Washington:

KNOWING THAT the production of food is the paramount problem before the world today, and

KNOWING THAT the President of the United States has called upon us to help feed the people in the stricken areas of Europe, and

KNOWING THAT everything possible must be done to produce food as close to the place of consumption as possible; therefore, be it

Resolved by the Advertising Club of Washington, That its members co-operate with the National War Garden Commission in its campaign for Victory Gardens by using window displays and garden copy wherever possible in order to carry the message of Food F. O. B. the Kitchen Door to the people, and be it further

Resolved, That we urge the Associated Advertising Clubs of the world to co-operate and that this resolution be sent to them.

The opening of the home garden drive this year and every succeeding year should be celebrated by a national holiday. It is a new independence day for the nation; and the home soldiers of the soil should have some-

way of expressing the freedom which they have found in the garden. Of course, there is no fixed first planting day throughout the United States or even throughout a restricted territory; but some day might be fixed which would answer the purpose of calling attention in a nation-wide way to this great institution—the home and community garden. Pageants and parades can be arranged in the various cities.

On the last Sunday in March the Daylight Saving Law goes into effect again, just in time to give the victory gardener the advantage of the extra hour of daylight



A CLEAN LOOKING PATCH

Pupils of the Tondo intermediate school at Manila are taught gardening, as is shown by this picture, and they are teaching their elders much about the work.



Photographs, Bureau of Agriculture, Philippine Islands
IN A PHILIPPINE GARDEN

The message of "Food F. O. B. the Kitchen Door" has spread to the lands beyond the sea; and the Filipino wards of Uncle Sam are doing fine work in home and community gardening.

every afternoon which meant so much to him last year and which meant the addition of millions of dollars to the nation's garden products.

Are you going to have a part in the harvest of victory? Will you help to conquer the new enemy, Hunger, which is killing thousands of people in lands across the seas? If you have not yet planted a Victory Garden, plan to do it today.

PHILIP W. AYRES ELECTED PRESIDENT OF THE APPALACHIAN MOUNTAIN CLUB.

FOR the first time in its history, the Appalachian Mountain Club has chosen a member of the forestry profession to lead it. At the recent meeting of the club, Philip W. Ayres, who has for years accomplished notable things for forestry in the State of New Hampshire, and who is the Forester of the Society for the Protection of New Hampshire Forests was elected President.

The members number over 2,000. There are well-developed chapters of the club in New York City and in Worcester, Massachusetts, while the general membership is more widely extended, including several members in Washington, District of Columbia. Its honorary and corresponding members include the distinguished mountaineers of Europe and America.

The club has eleven forest reservations in New Hampshire, varying in size from 1 to 300 acres, besides three reservations in Massachusetts and two in Maine. It maintains 54 paths in the White Mountains covering 213 miles. It maintains three huts of a capacity of 35 to 40 each in the highest parts of the White Mountains, besides nine other camps and various other shelters at high elevations above 3,000 feet and some of them above 4,000 feet, throughout the mountains. All of these are as freely open to the tramping public as to club members. The club is actively co-operating with the supervisor of the White Mountain National Forest in the matter of trails, telephone lines and fire lines.

THE USES OF WOOD

FENCING MATERIALS FROM FORESTS

BY HU MAXWELL

Editor's Note:—This is the eleventh story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

THE forests have fenced American farms, orchards and yards. Much material other than wood is in use, and was used in the past, and doubtless will be in the future; but wood has held first place from the earliest times, and it is not inclined to yield that place now. It has been abundant and relatively cheap in many parts of the country, and in most ways has been satis-

the land in the process of clearing. Such a fence was a continuous windrow of brush extending round the field. The building of one of that sort was like killing two birds with one stone; for the removal of the brush cleared the land, and when properly piled, the brush constituted the fence. Such a fence answered most purposes when freshly built, but it soon decayed, and then



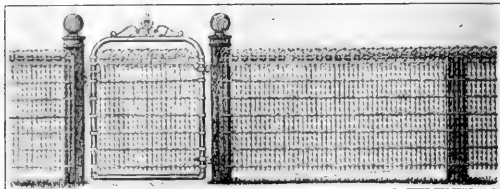
Courtesy of "The White Pine Bureau"

WHITE PINE GATES OF QUALITY

An attractive gate gives class to premises and furnishes an introduction which never fails to impress favorably those who see it for the first time. Architects and landscape gardeners understand how to make the most of this asset. In this respect, wood seems more genuine than metal. This is the gate at famous "Beverly" on the Pocomoke River, Maryland.

factory. The kinds of fences built of wood, or partly of wood, have been numerous and interesting, and fashion has been regulated largely by convenience. The first fence that encloses a newly-cleared field in a forested region may not be the same in style, appearance, and construction as that enclosing the meadow which occupies the same site a century later. The original fence may have consisted of brush, limbs, and poles procured from

it settled so low that horses, cattle, and sheep could walk over it at will and thus enter and depart from enclosures. The brush fence never was much protection against hogs, for these animals were able to force passage through and under, and a short period of decay put such a structure out of commission. The brush fence used to be common and it has not yet become obsolete. It was never regarded as a wholly creditable farm improve-



RAILING AND POSTS OF WOOD

Fences of metal, in rods, bars, or wire, are frequently held up by posts and rails of wood. It is difficult to find a substitute for wood at reasonable cost. Wooden posts may be given preservative treatment to prolong their period of usefulness and to increase value. This is now done on a large scale.

ment, but rather as a makeshift for temporary service only.

The log fence, or that made of logs, poles, and brush in combination, was formerly more common than it is now. It differed only slightly from the common brush fence. It might last a year or two longer if the destroying agent was decay alone. It was often easier to roll logs, trunks, and branches together and build a fence of them to enclose a field than to bring them together in heaps and rid the ground of their presence by burning. A week of constant attention might be necessary to rid the ground of a group of log heaps by burning, but when rolled to the margin to form a fence, the logs were out of the way. Some fences were built of stumps pulled from the ground and their roots all turned in one direction. Such were more common in northern pine regions than elsewhere, because pine stumps are easily pulled from the ground and they retain their roots many years. A structure like that is sometimes known as a Canada fence because common in the pine regions of Canada.

The fence rail was the ever-present

and all-important unit of fencing material. It still occupies a conspicuous place, but has lost some of its popularity. The rail is split from timber, and the regulation length is eleven feet, but variations in length are many. Rail-splitting was a common occupation in early times. Farmers mauled the rails with which they enclosed their fields. The splitting was done with mauls, iron wedges, and wooden gluts; and a strong, industrious man, when he had good timber already cut into suitable lengths, could split 400 or 500 rails a day. Champions had records as high as 1,000 rails a day; but such a number was impossible except under the most favorable circumstances. The rail fence is usually constructed with zig-zag panels, the pattern being known as a "worm" fence or "Virginia" fence, the first name being due to the resemblance of the line to the path of a crawling worm.

Rails have varied much in size, according to timber



ORNAMENTAL RATHER THAN USEFUL

Rustic fences are built in many styles, but most of them are intended to be ornamental. In most instances other kinds of fence could be built for less money, but cheapness is not the main purpose held in view by builders of fences of this kind. The rustic fence is often readily made in factories.

and region. During the Civil War, lines of walnut fence in Indiana were purchased by gunstock manufacturers, and it is said that those rails averaged the equivalent of fifteen board feet per rail. A mile of that fence represented

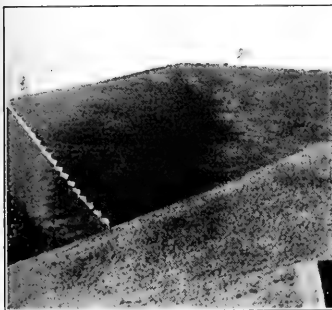
enough timber to saw 75,000 feet of boards. The staked and ridged fence required a little more. Enormous quantities of timber have been mauled into rails in some of the forested regions, where wood was cheap, fields small and farms numerous. The West Virginia Conservation Commission estimated that, from the earliest settlement



IS THIS TOO GOOD FOR FENCES?

They figure that enough wood is in these two cars of logs to make two-thirds of a mile of plank fence, but that the lumber will be of a grade too good for fencing. That is a matter on which opinions may differ. The best white pine of New England was not considered too good for fencing. These logs are Douglas fir.

of that State down to the year 1900, no less than 4,500,000,000 feet of timber had been split into fence rails.



WORM FENCES ENCLOSING MOUNTAIN FIELDS

A few long lines of fence like this may still be seen in mountainous regions where timber has only recently become salable, and was formerly mauled into rails. Replacements are now made with posts and planks or posts and wire. This fence is in Tucker County, West Virginia.

Most of it was oak and chestnut, but some was yellow poplar, black walnut, white pine, white ash, and slippery elm. Worm fences are still being built, but they are disappearing in favor of wire and boards, or of straight fences constructed of rails and posts. The post-and-rail fence has been considered

as the connecting link between the pioneer worm fence and the plank fence. It was once made of flat rails whose

ends were fitted in holes mortised in posts set ten feet apart. Such fences ran in straight lines. It was a little cheaper than the worm fence if timber had any value. It required about 55,000 feet of timber to make a mile. The plank fence uses sawed lumber instead of flat rails, and nails are the fastenings instead of mortises and tenons as in the post-and-rail pattern. A plank fence may be built with from 30,000 to 40,000



HOW A "SWEDE FENCE" BRISTLES

Such fences are constructed up and down steep hills where the ordinary worm fence will not stick to the ground. This one defies the worst farm rogues, having been modeled after an old military device constructed to stop cavalry. This fence is on a farm among the Allegheny mountains.

feet of lumber per mile, including the posts. There is another pattern of rail fence much used on very steep



Courtesy of "The White Pine Bureau"

FINE AND FAULTLESS AFTER A CENTURY

The white pine palings enclosing the famous Spaulding House at Nashua, New Hampshire, show few signs of deterioration after a long period of exposure to the weather. The fence has received care and has been kept well painted. Neglect is the greatest enemy of out-of-door woodwork.

ground where the common worm fence will not stand. It is known as a "swede" fence, so named from its resemblance to an old military contrivance built of spikes called "swedish feathers," and intended to check attacks of cavalry. In building the swede fence one end of the rail rests on the ground while the other end is elevated at an angle of thirty or forty degrees and is supported on stakes which cross each other like the letter X.

Various patterns of paling and picket fences are in use, in some of which the pickets are held by nails, in

decay. Relatively few woods possess both of these qualities in the desired degree.

It is not practicable to make a list of rail timbers to include all the good and exclude all the bad. It depends largely upon the region. Where white oak and chestnut were plentiful, rail splitters used few others in former times; but some regions had neither of these. Black walnut was more durable than oak or chestnut, but its range was limited to certain districts, and chiefly to rich land; consequently, only here and there were walnut fences possible. Yellow poplar splits well, but it is brittle, breaks easily, and is prone to decay when exposed to the weather, and its use as rails was restricted by a prejudice against it even in regions where trees were plentiful and of splendid size. Many pine rails were made formerly, and a few are still made, but unless the sapwood is excluded, the pine rail rots quickly. White ash splits in a beautiful manner, and before the wood became valuable in a commercial way, much splendid ash timber was maulled into rails. All cedar with highly colored heartwood makes good fence rails; but only a few cedars are large enough for splitting, after the sapwood has been excluded; and some cedar splits none too well. Millions of rails were made of southern red cedar, and trainloads of such rails were brought up many years



Photograph by Courtesy of the Hartmann-Sanders Company

THE PERGOLA'S FINISHING TOUCHES

Happy surroundings tend to convert idle moments into years of pleasant memories and the pergola has helped transform many barren spaces into spots of charm and beauty.

others they are woven with wire; and in a few of the old cypress picket fences of the South, wooden pegs were used in place of nails. In some instances it has been found that the peg was the better fastener, for it remained sound after nails of the same age had been destroyed by rust. The picket fence involves a catch problem in geometry which some of the old-time pedagogues thought quite interesting, and they liked to put it up to their advanced pupils thus: "Prove that more pickets are required for a mile of fence on level ground than for a mile up and down hills." The pupil who could prove the positive side of the proposition and round out his reasoning with the formal and classic *quad erat demonstrandum*, always received one hundred per cent in his grade in mathematics.

Every species of wood in the United States which attains sufficient size, has done service as fence rails, either after being split or in the form of round poles; but not one species in twenty is satisfactory for split rails, crude and common as such rails are. A wood has generally been considered defective as a fence rail prospect unless it could be split easily and was resistant to



CATALPA FOR FENCE POSTS

This cut shows a small catalpa tree just attaining size fitting it for fence posts. It is one of the handsomest trees of our forests and its large leaves and showy flowers cause it to be planted oftener for ornament than for posts. However, it serves both purposes well, and is widely used.

later to be made into lead pencils. On the northern Pacific coast the giant red cedar contributed rails for many a mile of fence. In California a similar service was exacted of the incense cedar; but the rail fence was never as popular in the far west as it was in the eastern country in early times. The westerners preferred to use



OSAGE ORANGE FENCE POSTS IN KANSAS

These posts are cut from planted timber, for Osage orange is not a native tree in Kansas. It once formed hundreds of miles of hedge fence in the treeless states, and now some of these hedges are being cut for fence posts, having reached that size because they were not kept cut back.

the incense cedar for posts and finish the fence with lumber cut from yellow and sugar pines or from redwood. Southern cypress possesses the essential qualities required of good rail timber, and much of it was once put to that use.

Nearly any wood may occasionally be made into rails, either because it is convenient, or because no better is in reach. One rather abundant tree is never worked into rails, because it is unworkable. It is black gum which



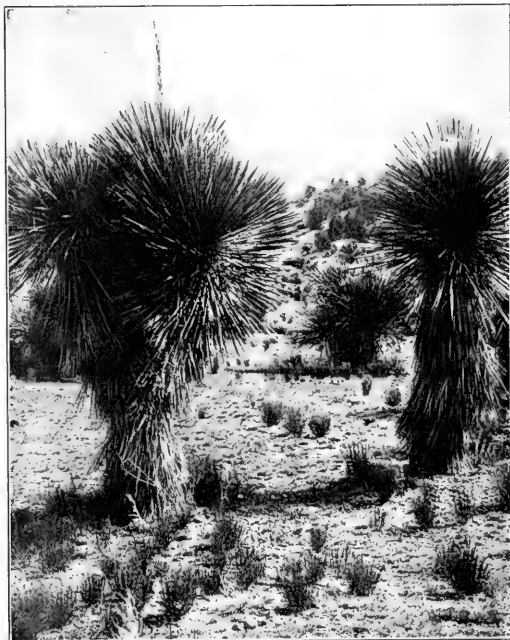
RAMSHACKLE RAIL FENCES

Unless rail fences are kept in repair, they are not things of beauty and may soon cease to be things of utility. There are reasons to feel thankful that old style rail fences are passing out of use. They are wasteful of both wood and ground. This is a scene in southern Indiana.

cannot be split unless solidly frozen. Old rail splitters always liked to initiate a novice by assigning him a black gum log to split, and then joshing him on the subject of his speed.

The best trees were always selected by rail makers (speaking in the past tense) because such were more easily split than those that were crooked and knotty. The result was, in pioneer times, that the very finest oak, chestnut, ash, and walnut were cut for rail fence material.

Enormous numbers of fence posts are now in use and have long been in demand. The chief quality of posts must be durability. They are always in contact with the ground, and at the point of contact decay is active. For that reason it is necessary to select the more durable woods for posts if long service is wanted. Probably half



UNUSUAL BUT EXCELLENT FENCE MATERIAL

These uncouth specimens, which might be mistaken for vegetable porcupines, are tree yuccas growing on the Lincoln National Forest, in New Mexico. Stockmen use the dead and dry trunks in making corral fences. The logs are set on end in the ground, forming palisades which answer the purpose well in regions where other timber is scarce. Photograph by the United States Forest Service.

of the fence posts in use are neither sawed nor split. They are round poles, sometimes with the bark still on, but commonly peeled. It is not so essential with posts as with rails that the wood split readily, though trees more than six or eight inches in diameter are generally sawed or split before being set as posts.

Trees of every species, if large enough, may be used for posts; but some of them decay so quickly that they are scarcely worth the trouble of setting. A post that does not last five or six years is unprofitable. A split or sawed post usually lasts longer than one of the same wood in the round, because the round post is apt to con-

tain a higher proportion of sapwood than the sawed post, and the larger the proportion of heartwood the longer the post will likely last. Every forested region has certain woods more durable than others, and these are preferred for fence posts. The following woods are regarded as good post material in regions where they can be had:

Yellow or black locust occurs in the middle Appalachian region. This tree's range has been widely extended by planting.

Incense cedar and redwood abound in California and in southern Oregon. The posts are always sawed or split from large trees and the sapwood is rejected.

Osage orange or bois d'arc grows in Texas and Oklahoma. The sap is very thin, round posts are not objectionable, and those sawed or split are not often seen.

Chestnut ranges from Connecticut to Georgia, and the posts are sawed, split, or round.

White oaks of more than a dozen species are made into posts in practically all parts of the United States. The posts are nearly always sawed or split.

Black walnut heartwood is very durable, but the sapwood is nearly worthless for posts. Black walnut was

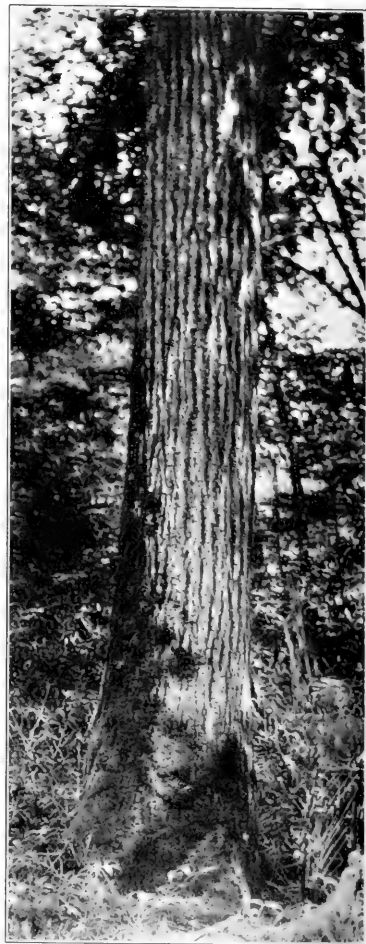
never largely used for posts.

Mulberry heartwood is durable and posts from large trunks last well, but the trees are not abundant.

Mesquite and several other leguminous species of the Southwest have thin sapwood, very durable heart, and make good posts, though the boles and branches are usually very crooked.

Southern red and white cedars, and northern white cedar or arborvitae, are extensively used for posts and are shipped far from the region where they grow.

Catalpa lasts well, and since most catalpa posts are cut from planted trees, the range of



IDEAL TREE FOR RAIL SPLITTERS

Millions of fence rails have been mauld from such oaks as this. The pioneer fence builder picked the largest, finest trees because of the ease with which they could be split and of the symmetrical rails produced. Heartwood was wanted, and large trunks contained relatively more of it than small.

this wood covers most states in the Mississippi Valley, and also in other regions. The principal original range of catalpa was restricted to the lower Ohio Valley.

The question as to what wood is most durable as fence posts has not been decided. Both the wood and the situation must be taken into consideration. Locust and Osage orange are rivals for first place, if situations are the same; while in the dry climate of California, incense cedar and redwood last a long time. In the southern country they have called cypress the "wood eternal," under the assumption that decay has little effect upon it. It lasts a long time, but not forever.

The practice of treating fence posts with preservatives to hinder decay has become extensive and is on the in-



VIRGINIA RED CEDAR

This tree is known as the Virginia red cedar, but at the present time more of it is cut for posts in Texas than in Virginia. It grows in all southern states, and in Tennessee much of it was formerly split for fence rails, but it is no longer used in that way. Few woods resist decay better than this cedar.

crease. By such treatment, some woods which are not naturally durable may be converted into long-lasting posts.

It has been said that America has used more wood for fences than for houses, and the statement is probably true. Wooden fences are peculiarly liable to destruction by decay, fire and flood; and they must be repaired or renewed often. They can have little protection against weather. Paint is occasionally applied, but not often. They are in contact with grass, weeds, and leaves, all of which promote decay. Fires were more destructive in the past than at present, but even yet much fencing is consumed in grass and forest fires.

No one can name a maximum, minimum, or average period of service for a wooden fence. So many influences and accidents must be taken into account that one case is not like any other. A fence of round buckeye poles among the Allegheny mountains has been known to rot down in a single year; and a similar fence of red alder on the Pacific coast may be useless through decay in a time equally short. On some of the high and dry ridges of western Maryland and the adjoining parts of Pennsylvania, farmers point with pride to worm fences of chestnut rails and claim that their grandfathers built them nearly a century ago. Old-fashioned doctors

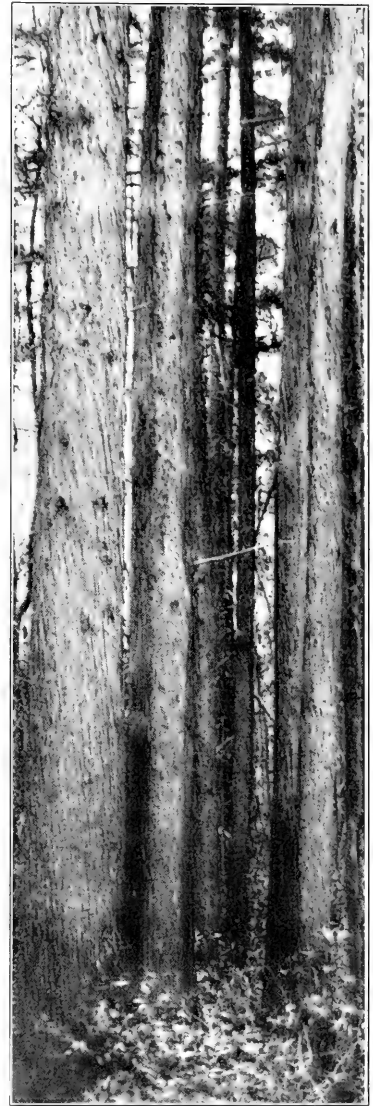


PRIME NORTHERN WHITE PINE

Thousands of miles of plank fence in the northern states from Maine to Minnesota have been built of white pine boards cut from trees as faultless as that in the accompanying illustration; but at the present time timber of that class is seldom used for fencing purposes.

of that region formerly made a rheumatism remedy which is not listed in the dispensaries. It was distilled from the moss-covered chestnut rails, the oldest and dryest that could be found. The wood was hogged with an ax, placed beneath a bottom-up kettle that had a fire built on top, and in that manner the oil was roasted out of the chestnut wood. "A teacup of chestnut rail oil, well rubbed in" was declared to be a cure for any case of rheumatism that was curable. The only interesting point in the prescription is that the fence rail must be a hundred years old. Some of the cypress paling fences in the southern states, and the white pine palings in the North, are reputed to be a hundred years old. Ordinarily a chestnut or oak rail fence needs a good deal of repairing at the end of fifteen or twenty years, and in less time if the fence is permitted to be overgrown with brush, as the custom is with untidy farmers.

Fences have never been the product of factories, except to a very limited extent. It has always been the custom to procure the raw material, haul it to the desired place, and build the fence in situ. That has held true whether it was a rail fence, or one of planks and posts, pickets, or posts and wire. Occasionally, the raw material grows on the ground to be enclosed by the fence. That was usually the case in pioneer days when the clearing of the land was the heavy job and the building of the fence a side issue. In more recent times fences have usually



SOUTHERN WHITE CEDAR

All cedar is classed as good fence post material because of its durability when in contact with the ground. The cedar shown in the cut ranges from New Jersey to Florida, near the coast, often in very wet situations such as the Dramal Swamp in Virginia. Enormous quantities of posts of this wood are used yearly.

been made of materials brought wholly from a distance.

Gates and some kinds of fencing are now the product of factories. Such factories are often located near large mills or in lumber centers. Several articles are included in the output, among them being gates, ready to hang in place; pickets ready for nailing up, or already made into panels suitable for fastening in place; woven fencing consisting of slats attached to strands of wire. The gates are of various patterns, fitted for different service. Some are small and intended for dooryards, others are farm gates for fields. The slat-and-wire fence is sold in large rolls or spools for convenience in hauling and handling.

The industry which turns out fencing and gates as here described, is small in comparison with some of the other wood-using industries, yet the annual total of wood



TYPICAL OLD STYLE RAIL FENCE

This "worm fence" is an old timer. It is a survival from past generations, and except in a few regions only a few of them are left. The fence here shown has probably stood more than fifty years. When it finally disappears, it will be replaced with a fence of posts and wire or posts and boards.

consumed in the United States exceeds 23,000,000 feet. The principal gate and fence woods, and the yearly demand for each are here given:

	FEET
Yellow pine.....	6,765,000
Hemlock.....	5,152,000
Chestnut.....	5,121,000
White pine.....	3,883,000
Oak.....	2,640,000
Spruce.....	1,070,000
Douglas fir.....	805,000
Cypress.....	681,040
Cedar.....	465,500
Birch.....	300,000
Elm.....	155,000
Maple.....	140,000
Redwood.....	133,000
Basswood.....	50,000
Larch.....	48,000
Western Yellow Pine.....	33,000
Yellow poplar.....	5,000
Hickory.....	600
Total.....	27,448,840

The manufacturing of this material is not evenly distributed over the country. Thirty-four states produce none. Most of the manufacturing is confined to states listed below, with the yearly output of fencing and gates:

	FEET
Virginia.....	6,925,000
Minnesota.....	4,570,000
Iowa.....	950,000
New York.....	725,000
Washington.....	320,000
Indiana.....	176,000
Pennsylvania.....	161,000

More disputes, controversies, and quarrels have been caused by fences and lack of fences than by any other one cause during the whole journey of man from savagery up to the present hour. Even Homer, ancient as he was, based poetic similes and other figures of rhetoric, upon farmers scrapping over their line fences. Early laws in all countries were passed for the purpose of regulating boundaries, landmarks, and fences. Every state in this country has its laws on the subject. One of the first matters which statutes seek to settle is the definition of a "lawful fence"—how high it must be, and of what materials and construction. If roguish cattle break through or jump over a lawful fence, the owner of the stock is liable for damages. If land is not enclosed with a lawful fence, the owner of the land may be stopped from collecting damage for trespass. However the same laws do not hold everywhere. In some states "every man's line is his fence," and he need not build any fence except for his own convenience, and he can claim damages for trespass. Some laws fix the height of a lawful fence and specify the material of which it shall be built. There is wisdom in the old adage: "Good fences make good neighbors," the meaning being that community quarrels are reduced to a minimum if all the fences are in first-class order.



PROSPECTIVE POST TIMBER RUINED

Here is a young locust tree being devoured by borers. That fate is overtaking millions of locust trees in the United States. Large and small alike fall victims to these insects. No protection against the attacks is known, and when an attack is once made on a tree it is done for, though it may fight many years against its fate.

THE WATERFOWL

(Family Anatidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

TO ONE who is fond of nature in her wilder moods, there is nothing more fascinating than the flight of the waterfowl. Seen against a leaden sky or against the first flush of dawn, the sweep of their rapidly moving forms holds a charm that can be replaced by nothing else. The eye follows until as merest specks, they disappear into the haze, leaving one with a feeling that nature is not yet vanquished, that there are still great spaces

imprecation from many, will still find a joyful response in the men who go down after ducks.

Let us, therefore, wisely conserve what we have, and as the number of hunters increases, let the open season be shortened and the bag limit lowered. Let us propagate waterfowl in captivity with which to restock the marshes so that our children's children may still view the picture that made its appeal to our forefathers and to us.

There are over 200 species of waterfowl of which about fifty are found in North America. They are grouped into five sub-families or groups that are rather easily distinguished: the swans, the geese, the mergansers, the dabbling ducks, and the diving ducks. The swans have much longer necks than the other waterfowl, even longer than their bodies. The geese have shorter necks than the swans but longer than the ducks. The mer-

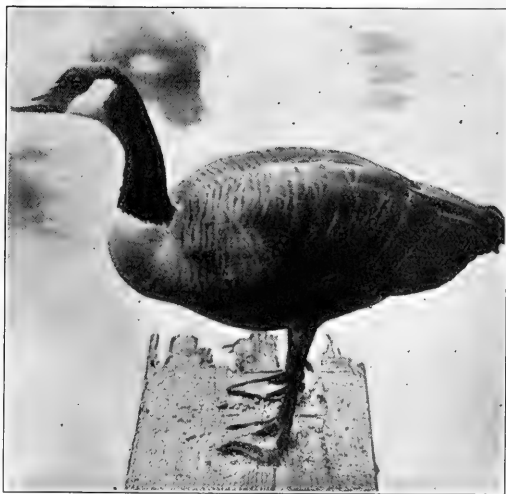


A MALLARD DUCK IN ITS NEST IN CAPTIVITY

Compare this bird with the drake mallard in breeding plumage and in "eclipse."

unexplored, that man, after all, is but one small part of the great creation.

Vast stretches of brown marsh, or waves lapping on the lake shore, or surf pounding on the headlands are the setting for a picture that clings to one's memory: there are decoys tossing on the waves, mere blocks of wood carved and painted to resemble ducks; crystals of snow driven before the blast cut and sting the face; frozen spray covers the blind and the hunters that lie in wait; Aeolus plays a tune in the gun barrels. The uninitiated wonder how men can endure such privations in the name of sport but they have not seen the picture, nor heard the music of the wind, and the waves, and the whistling wings. For nature has ordained that man shall not lose his primitive hunting instinct nor his love of primeval conditions that bring him close to her bosom. No matter how civilized the world may become nor how crowded her thoroughfares, the freezing winds, and the waves, and the ice and the snow that bring an



A CANADA GOOSE

Geese have longer necks than the ducks but shorter necks than the swans. This is the commonest species.

gansers differ from all the others in having narrow, serrate bills. The dabbling and diving ducks are readily distinguished from the swans, geese and mergansers but are not so easily separated from one another, unless one can observe their method of feeding or distinguish the lobe on the hind toe which characterizes the diving ducks. The dabbling ducks frequent the marshes and lake shores where they can feed in shallow water by tipping. They feed mostly at night or on dark days and spend the bright days at a safe distance from land. They usually occur in small flocks, those of over a hundred

being rare and those of from five to twenty much more numerous. They migrate earlier than the diving ducks, most of them having left the Northern States by the time the ponds and marshes have frozen. They winter from North Carolina to the Gulf and some species go as far as northern South America. The dabbling ducks are likewise called river ducks and summer ducks.

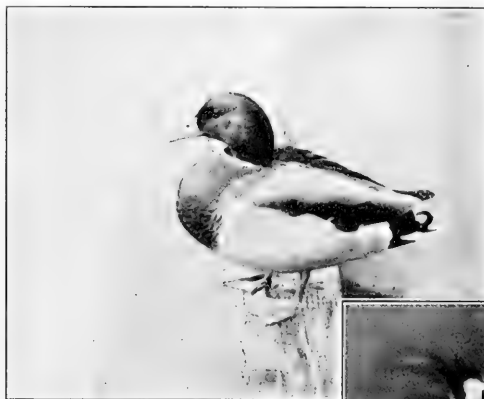
The diving ducks, sea ducks or winter ducks, on the other hand, often occur in flocks of several thousand and

is today one of the rarest of North American birds if, indeed, it is not extinct in the wild state. A few individuals are still living in captivity. The whistling swan still holds its own in a few places, now that it is protected by law, and every winter large flocks congregate on Currituck Sound and a few other good feeding areas. In summer the whistling swan retires to the barren grounds to breed where it is said to be very conspicuous on its nest but it is able to defend itself against all enemies up to the size of a fox.

Swans are noisy birds and when feeding or disporting themselves, their loud clarion-like notes can sometimes be heard for several miles. They can swim very rapidly and outdistance a man rowing a boat so that they do not take wing unless hard pressed. On the wing swans are easily distinguished by their large size, long necks and pure white plumage, not even the flight feathers being dark.

THE GEESE

Of the twenty-five species of geese in the world, eight are found in North America, of which the Canada goose is the most abundant and best known. Canada geese nest from northern United States northward to the limit of trees and winter from the Great Lakes southward to the Gulf. Their comings and goings are the most conspicuous bird migrations that we have. We hear their loud honking long before we see them as they travel high over head in a great wedge or Y led probably by an old gander. They migrate both by day



THE PROGENITOR OF OUR DOMESTIC DUCKS—A WILD MALLARD DRAKE IN BREEDING PLUMAGE

All the breeds of domestic ducks except the muscovy are thought to be descended from this bird. (The photographs of ducks on the plank are of wild birds in captivity.)

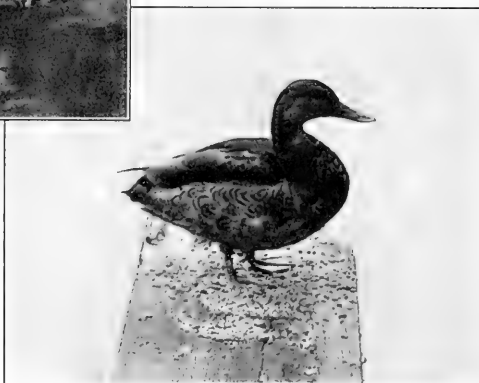
feed in deep water, often far from land, for they dive readily and secure their food of molluscs, or the roots and buds of aquatic plants in water up to 100 or 150 feet deep. They are not influenced by the freezing of the marshes and shallow water, therefore, and migrate later in the fall and winter further north than the others. They are less exposed than the dabbling ducks to enemies while feeding and, therefore, feed more during the day than at night. They are better adapted for diving than the dabblers, having larger feet, stockier bodies, shorter necks and shorter wings, characteristics which enable one, when familiar with them, to distinguish the two groups of ducks on the wing at a considerable distance. On the water, the diving ducks rest lower and do not hold their tails so high from the water as do the dabblers.

THE SWANS

Of the eight species of swans, there are two found in North America. Both species are pure white, except for the black bill and feet and a yellow spot between the eye and bill that distinguishes the whistling swan from the trumpeter. Both resemble very closely the domesticated swan of ornamental ponds which has been derived from the European mute swan and which can always be identified by the hump or knob on its bill. The trumpeter swan



A CANADA GOOSE FEEDING IN SHALLOW WATER



THE MALLARD DRAKE IN "ECLIPSE PLUMAGE"

The plumage is worn during July and August while the flight feathers are being replaced. It corresponds to the winter plumage of other birds.

and by night and sometimes on foggy nights apparently get lost and are attracted by the city lights and swing low over the house tops honking loud enough to waken even the most torpid.

On their migrations they are great vegetarians and are fond of grazing on the young wheat both in the spring and in the fall. In the south on their wintering grounds,

however, they seem to prefer to feed in the shallow water of the bays and lagoons, tipping for aquatic plants and animals.

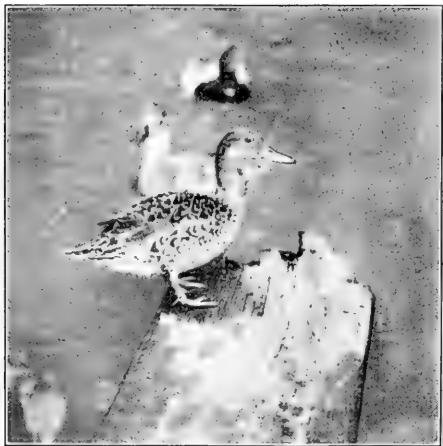
Geese are said to mate for life and, certainly in captivity, it is difficult to get old birds that have lost their mates to make another choice. The male goose is a dutiful husband and assists his spouse in hatching the

goose, is likewise found in parts of the West. In Alaska there is another species, the Emperor goose, which rarely comes south into the United States. It has a white head and tail and a bluish gray body more or less speckled with white. The chin and throat are dark, a constant difference from the rare blue goose which otherwise is a similar looking bird of eastern North America. The breeding range of the blue goose in northern Canada is unknown, but it winters in Louisiana. The white-fronted goose is very similar to the European Gray-lag goose, and therefore to our domestic geese which have been derived from it, with the exception that the region around the base of the bill is white in the native species.

THE MERGANSERS

The mergansers, sheldrakes, saw-bills, or fish ducks as they are variously known, form a very distinct group of waterfowl, easily distinguished by their narrow serrate bills and their crested heads.

Three of the nine species are found in North America but because of their fishy diet, they are nowhere valued as food. Individuals of the two smaller species, the hooded and red-breasted mergansers, however, are often eaten and pronounced as good as many of the true ducks. The females of all three species are grayish birds with conspicuously crested, reddish-brown heads, the

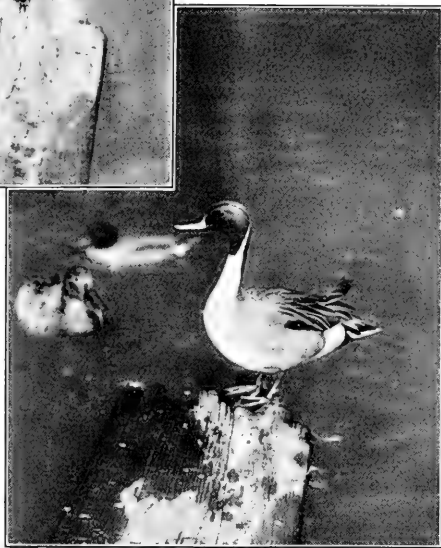


FEMALE PINTAIL

The female does not change her color during the molt. Here she has lost her flight feathers.

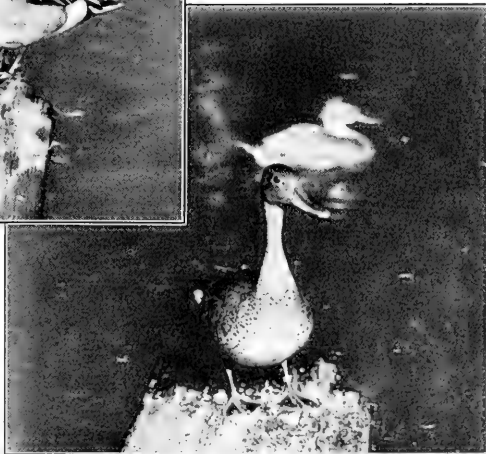
eggs and caring for the young. Both sexes are able to deliver severe blows with their wings which are armed with bony knobs at the first joint and they are, therefore, far from helpless even when they have shed all of their wing feathers and are unable to fly.

The Canada goose differs from the other species in having broad triangular patches of white on the cheeks which meet on the throat. The Hutchins, white-cheeked, and cackling geese are western representatives of the Canada goose. The two species of brant are similar to the Canada geese in having the head and neck black and the body grayish brown but the white is confined to a few white streaks forming a collar on the neck. They are considerably smaller and are confined largely to the sea coast, the black brant to the Pacific coast and the common brant to the Atlantic. The snow geese are easily recognized because they are pure white except for their black flight feathers and a grayish patch in the wing. The eastern greater snow goose is larger than the western lesser snow goose. A still smaller and rarer species, the Ross snow



MALE PINTAIL IN BREEDING PLUMAGE

The long neck of the dabbling ducks is greatly accentuated in the pintail.



MALE PINTAIL IN "ECLIPSE" PLUMAGE

This plumage is worn only while the flight feathers are being replaced instead of all winter as with most birds.

crest of the small hooded merganser being the largest. The males are conspicuously marked black and white birds, the male hooded being one of the most ornate of the waterfowl. Mergansers secure their food by diving and pursuing their prey beneath the water using only

their feet for propulsion. They first locate their prey by lowering their heads as they swim until their eyes are beneath the surface film and their serrate bills, with the hook-like nail at the tip, are well adapted for holding the slippery fish. Very often the gulls hover over the spot where the mergansers are fishing and swoop down on them when they come up with a fish. Before the poor birds can get a chance to juggle the fish about and swallow it, they are sometimes so annoyed by the gulls that they drop it and then the gulls promptly fall upon it and begin quarreling among themselves. Mergansers nest either in holes in trees or in crevices in the rocks and, like the other ducks, lay whitish, unspotted eggs.

THE DABBLING DUCKS

All of the domestic ducks and most of the ducks that are commonly known, belong to this group. Indeed all of the breeds of domestic ducks from the white Pekins to the Indian runners, with the exception of the muscovy, are thought to be descended from one species, the mallard or common wild duck, which is a typical member of this group. The muscovy is a very distinct species native to the West Indies and northern South America. The wild mallard differs but little in coloration from the domestic breed, the males having bright green heads and white rings around their necks and the females being uniformly streaked yellowish or grayish brown. Under domestication, however, the birds change considerably, becoming much heavier, with fatter heads and sagging bodies. In the wild state the mallard is found all over the Northern Hemisphere, though in North America, it is more abundant in the West and in the Mississippi Valley than in the East. Here its place is filled by the black duck or black mallard, as it is sometimes called, a warier species that is better able to take care of itself in more closely settled districts. Male and female black ducks are alike except for their bills which in the males are yellow and in the females

olive. They are uniformly brownish black except for the purple patches and the snowy white lining of the wings. Both the black and mallard ducks feed to a considerable extent in the grain fields in the northern states, spending the day out at sea or on the larger bodies of

water and feeding only at night. They are likewise residents of the marshes and it is here that they are most successfully hunted.

Space permits only a mention of the remaining dabbling ducks of which there are nine other species found in North America. The best known of these are the pintail, the baldpate, the shoveller, the gadwall, the blue-winged



FEMALE PINTAILS GETTING AWAY

Typical Dabbling ducks with longer necks, longer wings and more slender bodies than the divers. Compare with the scaup ducks.

and green-winged Teals, and the wood duck, the last being the most brilliantly colored of all. Its crested purplish green head, variously marked with white, its purplish chestnut breast and its buffy flanks all tend to make it a striking bird much desired on ornamental ponds. The males of the other species are quite beautifully marked in their breeding plumages with whites, browns, blues, and metallic colors but the females are uniformly plain.

The fall plumage of the male birds which is donned in late summer and worn for only a short time while the flight feathers are being replaced, resembles that of the females which is the same throughout the year. This early fall plumage of the males, which is never worn all winter as with most birds, is called the "eclipse" plumage. It serves to make the birds less conspicuous while they are replacing their flight feathers and are therefore comparatively helpless, for unlike most birds the ducks shed all these feathers simultaneously and are without the power of flight for four or five weeks until the new ones are grown.

With the exception of the wood duck, all the dabbling ducks regularly nest on the ground, usually near

water but sometimes a half a mile from it and in quite exposed situations. The nests are crude affairs of grasses and weeds but as incubation proceeds, the female plucks down from her breast with which she covers the eggs to



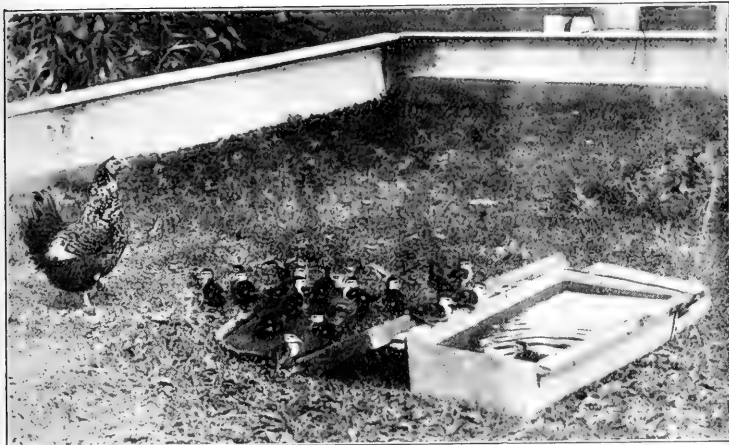
MALE GREEN-WINGED TEAL

The teal are the smallest of the ducks.



FEMALE GREEN WINGED TEAL

The bright colors are restricted to the male ducks.



A FOSTER MOTHER AND HER BROOD OF YOUNG WOOD DUCKS

The wood duck has become rare over most of its extensive range but will probably not become exterminated as it is protected by law and can now be reared successfully in captivity.

make them inconspicuous and to keep them warm while she leaves them to feed. For the males never assist in household cares, but, as soon as the eggs are laid, congregate in flocks by themselves and show no further interest. The wood duck is a notable exception for, in the first place it nests in a hole in a tree and in the second place the male attends the female and sometimes assists in incubation and such care as the young receive.

The wood duck has always been much in demand because of its bright colors and since

cies are the most abundant of our ducks, flocks of several thousand scaup ducks, for example, being a not uncommon sight on our larger bodies of water. The diving ability of these ducks can scarcely be exaggerated for some members of the sub-family, notably the old squaws, are repeatedly captured in gill nets set for fish in from 100 to 150 feet of water. Indeed, almost every year in the Great Lakes, thousands of these ducks become entangled in the nets and are drowned. The old squaws, scoters and eiders are believed to use their wings as well as their feet in diving, but the rest use



HOW THE DABBLING DUCKS FEED

A female pintail "dabbling" in shallow water.

it is not a very wary bird, it has fallen an easy prey to gunners until it has become very rare over a large part of its extensive range. As a result, the Federal Government has now declared a closed season upon it for a term of years. Fortu-

nately it is now quite easily reared in captivity and is, therefore, in no danger of absolute extinction.

THE DIVING DUCKS

There are seventeen species of diving ducks found in North America and some of the spe-



A MALE CANVASBACK STANDING

Note the large feet and erect posture characteristic of the diving ducks and compare with the mallards and teal.



Photograph by F. Overton

A FEW SCAUPS DUCKS, OR BROADBILLS AS THEY ARE KNOWN ON LONG ISLAND WHERE THIS PHOTOGRAPH WAS TAKEN

The Diving ducks occur in much larger flocks than the dabbling ducks; this is but part of the flock.

only their feet which are much larger than in the dabbling ducks. Their feet are likewise set farther back so that when on land they stand more erect or rest on their breasts and walk with difficulty. In nesting they prefer the marshes so that they can slip from their nests into the water without having to walk on dry land. With the exception of the ruddy duck they are northern breed-



BLACK DUCKS WINTERING WITH CANVASBACKS ON CAYUGA

The Black ducks are dabbling ducks, the canvasbacks divers. Note that the blacks rest higher on the water and hold their tails up from the water.

ing ducks, nesting from the northern tier of states northward.

The choicest of all the diving ducks is the canvasback, so-called from the white back of the male. The back of the female is gray and the head and neck cinnamon brown instead of rufous as in the male. A somewhat similar species is the redhead whose head is brighter red and whose back is grayer, not to mention other differ-



A RED HEAD AMONG THE CANVASBACKS AND SCAUP DUCKS

The Redhead is following a female Canvasback in the center of the picture. Note the difference in profiles.

ences. The long bill and sloping profile of the canvasback is a good distinguishing mark in any plumage for it can be distinguished at a considerable distance. The reputation of the canvasback has been gained largely through its habit of feeding upon wild celery (*Valisneria*) which is believed to impart a pleasant flavor.

Other ducks of this group are the greater and lesser scaup ducks, blue bills, broad bills or black heads as they are variously called, the ring-necked duck, the curious little ruddy duck with its upturned tail, the two species of golden-eyes and the bufflehead (which nest in trees, the scoters or sea coots of three species, and the four species of eider ducks from which comes the eider down of commerce.

The Laborador duck, another of the diving group, which formerly occurred in numbers along the Atlantic coast, in winter, as far south as New Jersey, is now extinct. The last specimen of this species was taken in



SCAUP DUCK FEEDING AT THE EDGE OF THE ICE

The males have the white flanks the females the white at the base of the bill.

1871 but the cause of its extinction is not known. It is suggestive, however, of what may occur to many others of our ducks if constant watchfulness is not maintained to adjust the protective laws to any decrease that may occur. The wild fowl are a great asset to the nation and we can ill afford to lose them. We must, therefore, keep up a constant vigilance to see that our laws give them all the protection they need and that these laws are respected and enforced.



CANVASBACKS WINTERING ON CAYUGA

There are a few Scaup ducks in the background. A Canvasback in the foreground is in the act of diving.

VARIOUS PARASITIC PLANTS; WITH AN OWL STORY

BY DR. R. W. SHUFELDT

FELLOW AMERICAN ORNITHOL. UNION, ETC.

(PHOTOGRAPHS BY THE AUTHOR)

TO THOSE who chance to reside in the District of Columbia, and are familiar with the adjacent territorial regions of Virginia and Maryland, it is hardly necessary to point out that all through this part of the country winter frequently holds nearly everything in nature in a very firm grip during the entire month of March. It is quite the exception when the reverse of this happens to be the case; and, as a matter of fact, should this first lap of spring be open or hard, the state of affairs with respect to flowers and other vegetation, in localities where they are so abundant in the woods and fields in spring, summer, and autumn, is the same—they have vanished. The trees are bare; and should there be snow on the ground, the only evidences of the plant life of the previous season are, here and there, the lifeless remains of the stalks of golden-rod, burdock, turtle-head, and a few other plants. But, as in other lands, there are winters and winters, and to this Washington forms

no exception. Some are practically of spring-like mildness from beginning to end, so that when March comes around, the month really begins and ends with days like those of the middle of April.

In and around the celebrated Rock Creek Park of Washington, we may see, in a stormy March, just such scenes as we have in Figure 1; or, within the limits of the "Zoo," such a wintry one as is depicted in Figure 2. When this chance to be the kind of season that comes to pass, it is idle to think of such a thing as a botanizing trip. So we must resort to the next best thing, and go carefully over our last year's notes and photographs, selecting some interesting group or two wherewith to fill in a March story. For example, such a group may be seen in the one to which the Cancer-roots and Broomrapes belong.

In suitable localities, the One-flowered Cancer-root may be found from Newfoundland to Virginia, thence across



WILD FOWL IN THE WASHINGTON "ZOO"

Fig. 1—Were we to leave out the little bridge and the rail fence, this wild swan and the Canada geese would make a very correct representation as to how these elegant game birds appear in their native haunts in the winter time.

the country to Texas, and westward to the Pacific coast. Usually it is found growing in damp or even wet woods, beneath the rank vegetation that most often is high above it. It is not very abundant in the neighborhood of Washington, the specimen shown in Figure 3 being the first one discovered for some years; it was found near the bank of a tiny stream that coursed through a swampy piece of woods, not far from a ford leading into Rock Creek Park. As will be noted in the illustration, this beautiful and delicate little flower tops a slender and quite naked stem. Each blossom is tubular and five-lobed,



Fig. 5—IN THIS CUT WE HAVE ANOTHER CURIOUS PLANT OF THE HEATH FAMILY, WHICH LIKEWISE HAS BEEN CALLED "PINESAP," THOUGH IT IS MORE GENERALLY KNOWN BY THE NAME OF FALSE BEECH DROPS (*Monotropa hypopitys*)

False Beech Drops, as a plant, belongs in the same genus with the Indian Pipe, notwithstanding the fact that the summit of its stem is not invariably "turned to one side."

the color being sometimes white, but most often pale violet or even purple. It possesses a faint, sweet fragrance, and to some extent this may attract the small bees that are responsible for its cross-fertilization.

This Naked Broom-rape, as it is sometimes called, is a leafless, parasitic plant that thrives upon the sap of other plants; that is to say, it is by nature parasitic—hence its lack of leaves. It rarely grows over six inches in height, and quite often several of them are found loosely bunched in a group. In Figure 3 the plants are seen to be growing near a rock, among blades of some swamp-grass; others near them grew at the foot of a beech tree.

Passing next to the Heath family, which is widely separated from the Broom-raphes, we find a remarkable as well as famous plant in the Indian Pipe, also known as Pine-sap and Ghost-plant. The group shown in Fig-

ure 4 was taken natural size, as in the case of all the other plants in this article, just as they grew in a forest of big pines and oaks. This genus has been named *Monotropa* for the reason that its flower-head turns to one side, and it only becomes erect when it goes to seed. Gray describes it briefly in the following words: "Low and fleshy herbs, tawny, reddish, or white; parasitic on roots, or growing upon decomposing vegetable matter; the clustered stems spring from a ball of matted, fibrous rootlets; furnished with scales or bracts in place of leaves; one to several flowered." The origin of the name is from the Greek. He claims that Indian Pipe is found in Mexico as well as in Asia. When picked, it soon shrivels up and turns a sooty black; while, if carried home with care, with plenty of moist, rich earth about its roots and planted in a proper environment, it will thrive



Fig. 6—THE GROUP OF FALSE BEECH DROPS HERE SHOWN IN FIGURE 5 WERE PHOTOGRAPHED IN SITU. IN THIS CUT WE HAVE ANOTHER SPECIMEN OF THE SURROUNDINGS CLEARED AWAY, IN THAT THE PLANT MAY BE MORE SATISFACTORILY STUDIED

The remarkable caterpillar shown on the suspended leaf is the larva of the Pipevine Swallowtail Butterfly (*Papilio philenor*), a beautiful form of that famous genus.

and eventually go to seed—its life-cycle offering, upon the whole, a most interesting and instructive chapter in the study of one of the most curious growths we have in our entire flora.

Mathews says of the Indian Pipe that when it goes to seed "the enlarged ovary finally assumes an erect

position, becoming a pale, tawny salmon color; it is usually ten-grooved and five-celled, and forms a large, fleshy, ovoid seed-vessel." In favorable localities we may meet with a considerable number of Indian

Pipe plants growing in the same piece of woods. In the hilly, timbered country north of Cabin John Bridge, west of Washington, is a great place to find them along in June; while further South, as in southern Virginia, they put in an appearance much earlier.

Gray divides the genus *Monotropa* into two groups or subgenera, namely, the *Eumonotropa*, represented by the Indian Pipe, and the *Hypopitys*, created to contain, in so far as eastern United

with False Beech-drops, it is a very different appearing plant (Figs. 5 and 6).

Quoting Mathews for these Beech-drops, he tells us that it is "a parasitic plant, which draws its sustenance

from the roots of the beech tree. The stem is tough, straight, almost upright-branched, stained with brown madder, and set with a few small, dry scales. The curved, tubular, dull magenta and buff-brown upper flowers are purple-striped; although generally sterile they are complete in every part, the style slightly protruding beyond, and the stamens just within the throat. The tiny lower flowers are cleistogamous—closed to outward agencies and self-fertilized. A few of the upper flowers are cross-fertilized by bees. 6-20 inches high. Beech woods, Maine, south and west to Wisconsin and Missouri. The



Fig. 4—HERE IS A GROUP OF INDIAN PIPE PLANTS TAKEN IN SITU, JUST AS THEY GREW IN NATURE. (*Monotropa uniflora*)

Indian Pipe is likewise called Corpse Plants and Pinesap, and some of its relatives in the Heath family (*Ericaceae*) are White Alder, Shin Leaf, Laurels, Azaleas, Cranberries, Huckleberries and a vast host of others.

name means on the beech."

Related to these Beech-drops, and in the same Broom-rape family, we have still another genus of parasitic plants, also represented by a single species, known as Squaw-root or Cancer-root. This genus is *Conopholis*, and the plant referred to is *C. americana*; it



Fig. 3—OUR "ONE-FLOWERED CANCER-ROOT" IS A CURIOUS PLANT AND THIS IS AN UNUSUALLY FINE SPECIMEN

The Broom-rape family (*Orobanchaceae*), to which this plant belongs, is not a very extensive one; its representatives, upon the other hand, possess a special interest for us.

States botany goes, *Monotropa hypopitys*, the vernacular name for which is Pinesap or False Beech Drops.

By way of explanation, it may be said that the plant called Beech Drops or Cancer-Root, belongs in the Broom-rape family (*Orobanchaceae*), in which the One-flowered Cancer-root (*O. uniflora*), described above, is found. True Beech-drops are not figured in the present article for the reason that, up to date, no specimens have been met with. As compared



Fig. 2—THE SOUTH VIEW OF THE MAMMAL HOUSE IN THE NATIONAL "ZOO" WITH ITS LOW, SQUARE TOWER—THIS BUILDING PRESENTS A MOST ATTRACTIVE PICTURE IN WINTER DRESS.

occurs over the greater part of eastern United States. Good descriptions of it will be found in most all the works devoted to the plants of the region just named.

Dissimilar as they are in general appearance, in all the botanies we find the Spotted Wintergreen (Figure 7) placed, in classification, as a close relative of the Indian Pipe; but then, as pointed out elsewhere, the Heath family, composed as it is of both shrubs and herbs, is a very heterogenous assemblage of plants. The Spotted Wintergreen referred to, *Chimaphila maculata*, is generally found growing in dense pine woods, where, with its dark green, white-striped leaves, it is a plant sure of attracting attention. The form of the leaves, as well as the appearance of the flowers, are well shown in the accompanying illustration.

Individual plants differ with respect to the striping of the leaves, some being very strong and conspicuous, and also as to the number of flowers. Often the latter is single; but as a matter of fact, there may be as many as five on one plant. The leaves are pointed and remotely toothed along their margins; moreover, they are generally curved from stem to point, the convex surface being uppermost, which latter is quite shiny. The white striping is on the upper aspect and in the neighborhood of the ribs or veins. Pipsissiwa may attain a height of eight or nine inches, but the majority of plants met with are shorter than this. It flowers during mid-summer, and has a range over the northern tier of States to Minnesota, southward to Georgia and Mississippi. As will be noted in the cut, the stalks bearing the beautiful flowers are long, slender and generally straight; they are, too, of a bright ruddy color. Each flower is borne at the end of a separate downward-curved stem, which is about an inch in length. Before bursting open, they are pretty little white balls, with their stems more distinctly curved downward, than they are after blooming.

A close relative of the Spotted Wintergreen is another Pipsissiwa, called Prince's Pine (*Chimaphila umbellata*); it is said to be more abundant than the Spotted form, with its leaves arranged in two whorls about the stem at

quite an interval apart. These leaves are not pointed as in *C. maculata*, but broadened at their outer ends; neither are they spotted. They are shiny and curved downwards. The flowers of this species closely resemble those of the Spotted variety, and rarely exceed five to the plant; its range is about the same.

Closely related to these *Chimaphilas* are two other genera, namely, the genus *Monesis* and the genus *Pyrola*. In the first we have the One-flowered *Pyrola* (*M. uniflora*) and in the latter the Shin-leaf (*Pyrola eleiptica*). The last-named ones, says Reed, "is the most common of the *Pyrolas*. The evergreen leaves are bright green, obscurely toothed, broadly elliptical, and narrowing into long stems that clasp at the base. During May a long,

smooth scape springs from the middle of the group of basal leaves to a height of five or ten inches, bearing, near its top, a raceme of several flowers. It is common throughout the United States and southern Canada." Reed does not say what the flowers are like, while another author at hand says that there are from seven to fifteen of these; that they are waxy, greenish-white in color, and very fragrant. As its name indicates, the One-flowered Wintergreen or *Pyrola* bears but a single flower on its upright stem, which is usually about five inches in height, though frequently it is much shorter. The flower is either white or pale pink, and does not differ very widely from a Wintergreen blossom. It is waxy and has five petals, and often measures half an inch across. At first the upper end of the stem is crooked over; but after going to seed, the pod stands erect at the summit of the stem.

Sometimes it occurs growing in colonies, and is then sure of attracting attention. This is invariably in the high, dry woods of the northeastern section of the United States, westward to Minnesota, and southward to the District of Columbia. It is usually in flower along in mid-summer, and it surely is one of the prettiest little plants of our woodland flora. Passing from flowers to Owls, attention is here invited to the Barred Owl (*Strix v. varia*) which has, for over two years, occupied a commodious cage all to himself in



Fig. 7—IN THE HEATH FAMILY WE ALSO HAVE THE GENUS *Chimaphila*, OF WHICH THERE ARE TWO SPECIES. THE PLANT HERE SHOWN IS ONE OF THEM, ITS COMMON NAME BEING THE SPOTTED WINTERGREEN (*C. maculata*)

Chimaphila derives its name from two Greek words, which together mean to love the winter.

the Bird House in the National "Zoo" at Washington, and which has a very interesting history. At this writing he is full grown, and in very beautiful plumage, while

down upon its perch, and allows its head and neck to hang way down below it, for a least ten inches or more. There are

those who will be interested to know what this Barred Owl looked like when it first left the hollow in the tree that its parents had selected as a nesting place. This I secured a few days after it came into my possession, and a reproduction of the photograph illustrates this brief biography.

It will be of interest to know that of the large number of species of owls we have in this country, that in the case of the owlets their first plumage is almost invariably white and downy as in the case of this young Barred Owl.



Fig. 9.—NESTLING OF THE BARRED OWL (*Strix v. varia*), A WELL KNOWN SPECIES OF THIS COUNTRY. ALTHOUGH NOW FULLY GROWN, THIS BIRD RECEIVES BOTH ROOM AND BOARD FREE FROM THE GOVERNMENT AT THE NATIONAL ZOOLOGICAL PARK AT WASHINGTON.

CRATER LAKE SHELL HOLE

CRATER LAKE was recently most aptly described by Representative Sinnot, of Oregon, when speaking from the floor of the House as follows:

"Crater Lake, cauldron-like and circular, 7,000 feet high, is perched amid the peaks. Perpendicular sides of slaggy lava rise over a thousand feet from waters of indigo blue six miles across and 2,000 feet deep.

"To the scientist, a mighty volcano collapsed within itself, Mount Mazama, 15,000 feet high, telescoped.

"To the poet, 'the sea of silence,' 'a lake of mystery.'

"To me, a shell hole of a war of worlds—who knows?

"Could the great blind poet have seen this marvel ere his pen had Lucifer and his host of rebel angels—

Hurled headlong flaming from the ethereal sky,
With hideous ruin and combustion, down—

in Miltonic imagery here he'd have found the impact."

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NEW ENGLAND FORESTRY CONGRESS

THE two-day session of the New England Forestry Congress held in Boston, February 24th and 25th marked the close of a period of fourteen years of development of state forestry in Massachusetts, and brought together many of the foremost foresters of the country for a general review and discussion of the place of forestry in public economy. In spite of the celebration due to the arrival of President Wilson on the 24th, the sessions were well attended and the audience followed the discussions with closest attention. Thirteen papers were given, each of which dealt with some subject of direct interest and was discussed not on the basis of theory or sentiment but from the results of experience and practical application. The first session was devoted to a consideration of the economic importance of forestry. The waterpower situation in New England and its dependence on forest protection was set forth by Henry I. Harriman, President of the Boston Chamber of Commerce. Richard T. Fisher, Director of the Harvard Forest and head of the Forest School gave an illuminating talk on "Home Grown Timber, the Hope of the Wood Using Industries of New England" in which he emphasized the facts which the average man has so far failed to grasp, namely, that it does not pay to have to ship timber 3,000 miles and pay freight charges, while at the same time the land capable of growing this timber lies idle at the factory doors. Ellwood Wilson, whose Company, the Laurentide Paper Company is spending \$100,000 per year in reforestation, set forth "The Relation of Pulp and Paper Manufacture to Forestry."

In the afternoon on Monday, while the guns were booming the salutes to the President and cheering crowds swayed round the Copley Plaza, the program of the meeting, somewhat more thinly attended, proceeded within. Dr. Metcalf, Chief of the Division of Forest Pathology of the United States Bureau of Plant Industry discussed "Fungus Diseases at Work in our Forests" and brought up to date the knowledge of the White Pine Blister Rust. E. C. Hirst, State Forester of New Hampshire, recently returned from the management of the ten sawmill units sent to Scotland, talked on "Co-operation in Forest Fire Protection." Commissioner George D. Pratt of New York gave an illustrated lecture on the work of the Conservation Commission in protecting the Adirondacks.

In the evening, at the banquet given at the Copley Plaza, Forester Henry S. Graves gave an address on "The Need of Private Forestry" which should be in the hands of every citizen. His analysis of the economic situation with which this country is faced, and the relation of private timber holdings to the problem may well serve as a basis for constructive efforts in the future.

On Tuesday, the morning session was devoted to "State Forest Policy." Dr. J. T. Rothrock, the veteran state forest commissioner of Pennsylvania, now retired, discussed the problems of re-organization now facing that department and strongly advocated the continuance

of the separate department under which the work had developed.

H. H. Chapman, Professor of Forest Management of the Yale Forest School, discussed "State Forest Policies in the United States." The principle emphasis of this discussion was laid on the necessity of maintaining separate departments of Forestry instead of effecting consolidations with other branches of state activity. Massachusetts is faced with a re-organization of this kind, and there is a serious danger that the initiative and efficiency of the work will suffer unless kept in a department free to develop and cope with the big problems which it faces. It was shown by Mr. Chapman that out of thirty states with forest organizations, fourteen had kept the work of forestry entirely independent, three more practically so by nominal connection with state land departments, six had tried combination with fish and game protection, four with state geology, two with state experiment stations and but one with State Boards of Agriculture. The effect of these combinations on forestry was in each case determined by the degree to which forestry officials were subordinated to other officials. Game wardens have almost never succeeded in developing a progressive program of forestry, no matter how well intentioned they might be. State geologists have had better success—being scientists and specialists themselves they have given the State Forester the initiative and sympathetic support needed. Foresters connected with Agricultural Experiment Stations have been free to develop forest education and demonstrations for encouragement of private forestry, for much the same reason—just as the members of a college faculty are given freedom of initiation in research.

But the one experiment in combining State forestry with agriculture in the State of Vermont proved a failure, and enabled the interests which are always seeking an opportunity to control State departments for their own ends to overturn this department, oust the State Forester, against whom not a shadow of criticism could be found, and reduce the office of Forester to that of an unimportant subordinate of the Commissioner. It was strongly urged that Massachusetts recognize the tremendous economic interests at stake—with three-fifths of the area of the State suitable chiefly for forest production—and set the work on a firm foundation by the maintenance of a separate State Forestry Department.

This view was supported by the Congress, which passed strong resolutions to that effect.

A paper was read from Dr. B. E. Fernow, the dean of American foresters, on "Forestry Policies of Foreign Countries." One of the most instructive papers was by W. R. Brown on "Results of Twenty-five Years' Clean Cutting and Selective Cutting in New England." This paper was a digest of what had actually happened following the efforts of the Berlin Mills Company to practice forestry on their holdings. Facts such as have been shown on these cuttings will be the basis of all successful

future operations in forest management, and this paper will serve as a starting point for a new era in silvicultural practice in the spruce regions.

Forrest H. Colby, Forest Commissioner of Maine, followed with a discussion on slash disposal. The final number was on the subject of "Forest Research," by Prof. J. W. Toumey, of the Yale Forest School.

The Congress passed resolutions favoring the extension of the operation of the Weeks law, the undertaking of a timber census, the extension of regulation of the management of private lands by insistence on proper fire

protection and the adoption of measures which will insure the protection of the land for timber production, the passage of a bill by Congress extending aid to forest research by States and urging the State of Massachusetts to maintain a separate State Forestry Department.

The meeting was conducted under the auspices of the Boston Chamber of Commerce and the Massachusetts Forestry Association. The proceedings will be published, and will thus be made available to foresters and the general public.

EDITORIAL

REORGANIZATION IN MASSACHUSETTS

FORESTRY in Massachusetts is facing the problem of reorganization. The Constitution provides that all of the State's activities, now numbering some 110 departments, must be reorganized into not more than 20. The wisdom of such a provision is not a subject of debate, since the matter is settled. It remains to determine what will become of State forestry in the scramble.

The answer depends upon the attitude which the people of Massachusetts take toward State forestry and their estimate of its relative importance in the general scheme of things. First, is forestry of sufficient importance in the economic welfare of the State to merit a separate organization as one of 20 departments? Second, if not, what combination will give the best results for forestry and for the public?

The handicap under which forestry as a public policy has suffered in this country is a surprising lack of foresight and comprehension of what it means in the economic life of the average man. Prices of wood products go up at a rate faster than that of other commodities, and the public grumbles and seeks for evidence of a lumber trust, when the cause lies in the denuded hills at their own doors and the freight bills on Oregon fir. Hind-sight may be better than foresight. Many a bankrupt can understand the causes for his failure after it happens. We are steadily bankrupting our forest industries and riotously expending the inheritance of nature, which we did not produce. Meanwhile there appears in our press such articles as "Timber's Horn of Plenty," in the *Literary Digest*, which lulls our senses to sleep by remarkable perversions of facts regarding the abundance of our timber supplies.

Three-fifths of the State's area unsuited for agriculture, but capable of producing 2,000,000,000 feet of timber annually, and with manufacturing industries dependent for their continuance on home-grown timber, and a lumber industry capable of employing permanently 30,000 men; with streams furnishing water power of tremendous value to her chief industries, and dependent absolutely on stream regulation through the maintenance of forest cover; with the scourge of the gypsy and brown-tail moths and the white pine blister rust calling for the united efforts of all organized forces to prevent

the complete destruction of both forest and shade trees, the State of Massachusetts still hesitates whether to put State forestry as one of her 20 departments. Yet this department is now nineteenth in point of appropriations and number of employees among the 110 branches of the present government.

Perhaps it is because the work of this department has scarcely begun, and for lack of actual demonstration of results, that the department is looked upon as a minor branch of the State's activities. In other words, foresight is to be eliminated in this reorganization of Massachusetts State Forestry, and the departments are to be crystallized in their present form.

That is just the reason above all others which demands a separate organization for State forestry. It is NOT established—the tremendous need for rapid expansion is clear to all who have true foresight. How is the average citizen ever to be brought to realize his need and to support the economic program of reforestation, fire protection and regulated timber cutting unless the State Department of Forestry is free to expand this educational work and its demonstrations of practical results? And if one thing has been clearly demonstrated in our State governments, it is the fact that when forestry departments are subordinated as a minor branch of a large organization, the scope of the forestry work becomes limited to the ideas, not of the forester, who comprehends the situation, but to some game warden, agricultural commissioner, or highway engineer, who provides first for what he does comprehend and permits forestry to gather the crumbs which fall from his table.

The future of State forestry in Massachusetts is in the balance. Pennsylvania's wonderful progress in forestry followed a reorganization which created the Department of Forestry as a separate organization in 1901. Massachusetts cannot afford to overlook the task ahead, for there will come a time when camouflage and evasion of economic facts will no longer be accepted by the citizens of the commonwealth, and they will ask, "Why are not these things done, and what has the State Forestry Department been doing to enlighten us and to protect our welfare?" The answer will be: "In 1919 the citizens

of Massachusetts did not consider the State Forestry Department of sufficient importance to stand alone and bear its own responsibility for success or failure. You placed us under another department, and we have been powerless to grow to the measure of our responsibilities. The fault rests on your shoulders."

IDAHO FOR MORE NATIONAL FORESTS

ON March 3, 1907, Congress prohibited the further creation of National Forests by Presidential Proclamation in the States of Washington, Oregon, Idaho, Montana, Wyoming, and Colorado. The late Theodore Roosevelt before signing this bill used the authority of which he was about to deprive himself in creating extensive areas of new National Forests in the six States mentioned. At the time, this action aroused tremendous protest, and was looked upon as a defiance of the wishes of Congress.

That the action of the President was in advance of public sentiment at the time no one will deny. In the State of Idaho especially a bitter antagonism existed towards the creation of National Forests, and this sentiment was actively expressed by the late Senator Heyburn. In the Thunder Mountain region of central Idaho a typical mining boom was under way, and out of deference to the wishes of the Senator and of the miners who feared Government restrictions, an area of 1,100,000 acres was omitted from the Proclamation and remained public land without National Forests, but entirely surrounded by them.

The period of 11 years which has elapsed has seen a tremendous reversal of public sentiment in every one of the above States. The Legislature of the State of Idaho has for two successive sessions passed resolutions petitioning Congress to create a National Forest out of this rejected Thunder Mountain area. In the last session both Houses of the Legislature passed this petition unanimously, while in the previous session there was but one dissenting vote in either House.

What is the reason for this change? The answer is a demonstration on the ground of the benefits of National Forest Service administration compared with the evils of unregulated use of public domain. The Thunder Mountain region has but one-half of one per cent of land fit for agriculture. Experience has abundantly demonstrated that nonagricultural timbered lands in the West are best regulated by National ownership and management under the principles adopted by the Forest Service. The Legislature of Idaho backed by all of the economic interests of the State now set forth in their memorial to Congress:

1. That fires range unchecked in this region and have destroyed 700 million feet of timber.
2. That the old roads built in the time of the boom have gone to pieces, and that for lack of transportation, and of State and local funds to develop roads, mining and water power development are impossible.
3. That wild life is being exterminated.

These are the questions to be met in the next few weeks by the great and general court of Massachusetts, which is trying to reach a wise solution of her problem. May we hope that they will have foresight, and place the responsibility of the forestry program squarely on the shoulders of a separate Forestry Department.

4. That hordes of sheep from Oregon invade this region annually, and are converting the entire area into a dust heap.

5. That no revenue whatever is being yielded by the resources of the region for the benefit of the State.

It is conspicuously true that this region whose carrying capacity for sheep is not over 75,000 is grazed by at least four times that number annually, and that local stockmen and settlers have no rights whatever. The indictment against the system of private initiative and "laissez faire" is a heavy one. What is the cure?

According to the Idaho Legislature, "Inclusion of said area within a National Forest would eliminate the annual destruction of timber by forest fire; make it possible for homestead settlers to secure titles to their lands under the Forest Homestead Act; give adequate system of regulated range use, thus conserving and perpetuating the forage resources for the benefit of the local residents and tax payers; make it possible for the State to realize its equity in the lands by relinquishing the unsurveyed school lands and selecting lands elsewhere; increase the revenue of the county and State through the receipt of 35 per cent of the gross receipts collected by the Forest Service; enlarge the power of the State to share in the benefits of the Federal Aid Road Act; and otherwise to assist in opening to development and use the vast National resources of the Thunder Mountain region."

This region on account of its inaccessibility has no value as a National Park. The surrounding area under National Forest administration has developed rapidly and the new road legislation will further stimulate this process.

The American Forestry Association has from the first stood firmly on the platform that National ownership and management of National Forests was fundamental to the welfare of Western States, and has resisted all efforts to secure support for the pernicious doctrine of dispersal and cession of these National possessions to the State. The State of Idaho is the latest convert to this doctrine, but apparently its conversion is thorough and complete.

THE Seventh Annual Meeting of the New York State Forestry Association was a most successful one and a great deal of interest was manifested in the discussion of a broad and varied program. Important addresses were delivered by Dean Hugh P. Baker, of the New York State College of Forestry at Syracuse; Prof. Ralph S. Hosmer, of the Department of Forestry at Cornell, and others.

"BIDDY", AN ORIGINAL BIRD

BY CLINTON G. ABBOTT

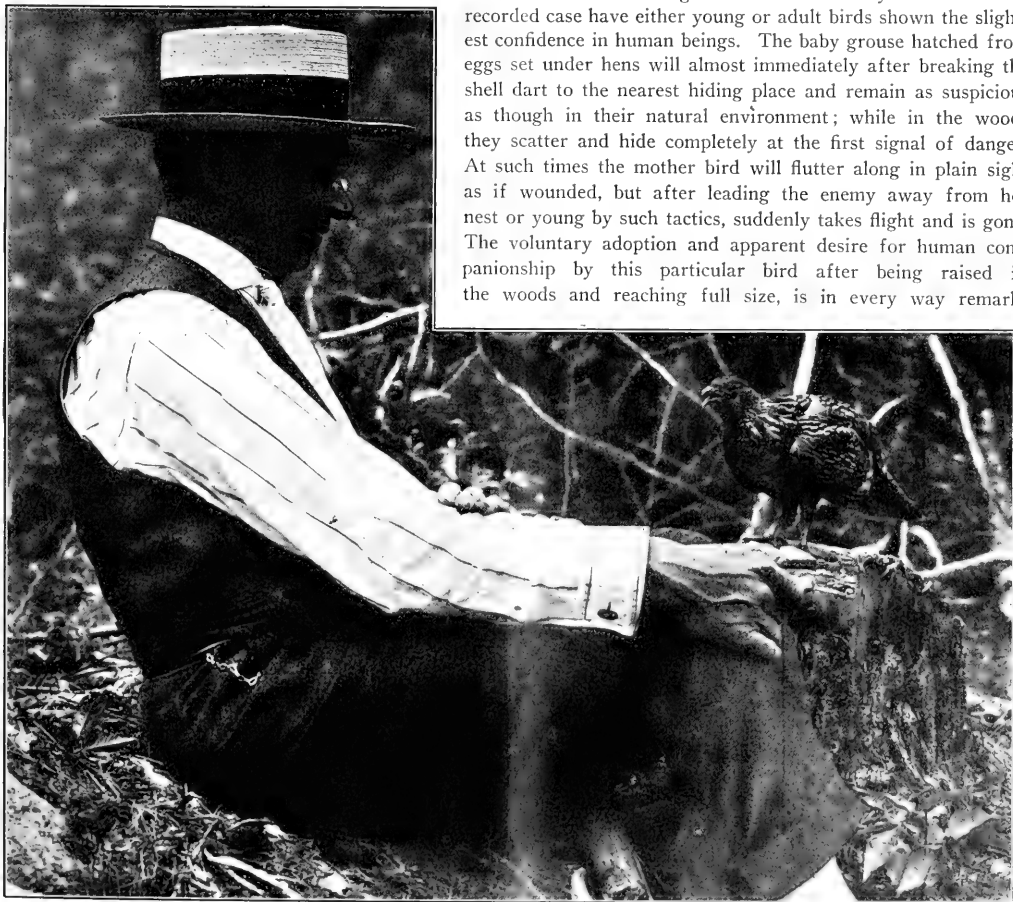
"BIDDY" did something no other grouse was ever known to do. This in itself is quite an achievement in an old world in which it is supposedly impossible to be original. Perhaps at some unknown time or in some obscure place, under an environment which creates a like line of bird thought, some other Bidy did what this remarkable bird has done. If so, there is no known record of it.

To relieve the suspense and start the narrative, it should be known that "Biddy" tamed herself, and thereby got into the movies. Be it further known that the proper name of the bird to which this pet name is applied is the ruffed grouse,

although incorrectly called the partridge in parts of the north woods. All of her family are beautifully marked and extremely shy woods birds, which shoot up from your feet with a rushing whirr of wings. The camouflage of her striped brown coat is protection from the keenest eyes, so that the danger of detection is slight, except during the flashing flight to greater safety.

The still and moving pictures of Bidy and the story of her unique adoption of man was told by the writer in a talk on Wild Life in the New York State Forests, at the September meeting of the New York State Forestry Association at Lake Placid Club, New York.

The appearance of this particular bird, both in the movies and in print, is due to the fact that all attempts to tame or domesticate the ruffed grouse have absolutely failed. In no recorded case have either young or adult birds shown the slightest confidence in human beings. The baby grouse hatched from eggs set under hens will almost immediately after breaking the shell dart to the nearest hiding place and remain as suspicious as though in their natural environment; while in the woods they scatter and hide completely at the first signal of danger. At such times the mother bird will flutter along in plain sight as if wounded, but after leading the enemy away from her nest or young by such tactics, suddenly takes flight and is gone. The voluntary adoption and apparent desire for human companionship by this particular bird after being raised in the woods and reaching full size, is in every way remark-



AN UNUSUAL CONVERSATION

"Biddy"—the queer little bird which, in defiance of all recorded laws of instinct and habit, sought and apparently thoroughly enjoyed the companionship of man, her hereditary enemy.

able. The story is an unusual chapter in wild life.

During the past winter, while the snow was very deep in the woods and it was very difficult for the grouse to obtain food, the men of a logging crew in the Catskills noticed that a partridge (grouse) apparently attracted by the sound of chopping, came to where they were at work and accepted crumbs from their lunch baskets. Her confidence gradually increased and she became a regular guest of the men in this particular cutting, and with her need for food satisfied still seemed to enjoy human companionship. She even became so friendly as to perch herself on sled loads of logs and ride towards camp, and upon one occasion the men even had to push her off to keep her in the woods where she was safe.

When food became bounteous, after the snow went off in the spring, it was expected of course that Biddy would return to her own kind, and be guided by the wild attributes of her nature. Strangely enough, however, she continued to appear at about the same spot in the woods, and those who had become fond of her learned that the sound of chopping or the beating of sticks together was sufficient to bring her a long distance.

Reports of this reached a local sportsman, who, by investigation, confirmed the story, and he later advised the Conservation Commission. The writer, therefore, packed up his camera and moving picture outfit, and with considerable doubt in his heart as to the outcome, visited this spot in the woods in company with his informant, one of the men who had been Biddy's friends during

the winter. He was assured that by pounding two sticks together Biddy would appear to have her photograph taken, but when no bird appeared after beating for some time he became quite skeptical of the whole story. Biddy's friend, however, kept insisting she would come if she heard them, even a long way off in the woods. He explained that it might mean a long walk, since grouse do not usually resort to flight, except to escape danger.



THE CONFIDENT APPROACH OF THE FRIENDLY LITTLE BIRD

Secure in her knowledge that a friend was calling, Biddy finally came, exhausted and warm, after traveling a long way—straight up to us, as if to say "Well, here I am."

Finally it came to look as though the writer's doubts were justified, and the man began to fear that his pet had fallen victim to some gun or animal. They, therefore, ceased "chopping" and sat down to eat their lunch. Before they finished the woodsman suddenly said: "There she is now," and out of the bushes walked Biddy. Her mouth was open, for it was a warm day, and her whole attitude was one of weariness, for she had apparently come for a long way. But she came straight up to them, as much as to say: "Well, here I am." She refused food, so her motive was not hunger, but the desire for human companionship.

The moving pictures taken by the writer show Biddy in a playful mood. She would rush up to them with feathers fluffed out, make a big show of fighting, much like a pet canary, then dart away to renew the attack. Rather rough treatment was taken in good part, and plainly understood by her as part of the game.

Thus it was that Biddy, the grouse, went into the movies, and built for herself a niche of fame in the bird kingdom of the Great North Woods.

RESEARCH WORK IN RECONSTRUCTION

AFORCE of nearly 400 employes of the United States Forest Products Laboratory is working in co-operation with the University of Wisconsin, on research work in connection with reconstruction.

The laboratory's war time achievements are unique in that practically all of them can be turned effectively to uses of peace. For example, the laboratory demonstrated the practicability of artificially drying freshly cut airplane stock, instead of storing it for a year or

more in sheds to season. At the time of the signing of the armistice, airplane stock was being dried by the laboratory method faster than was necessary to meet the demands of the manufacturers.

More than 300 kinds of the type developed by the laboratory in various parts of the country, which were used in drying airplane material, gunstocks and vehicle parts, for the use of the Government in war, can now be turned to account in the pursuit of peaceful occupations.

**WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE
THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.**

FOREST RESEARCH---IN THE WAR AND AFTER

BY EARLE H. CLAPP

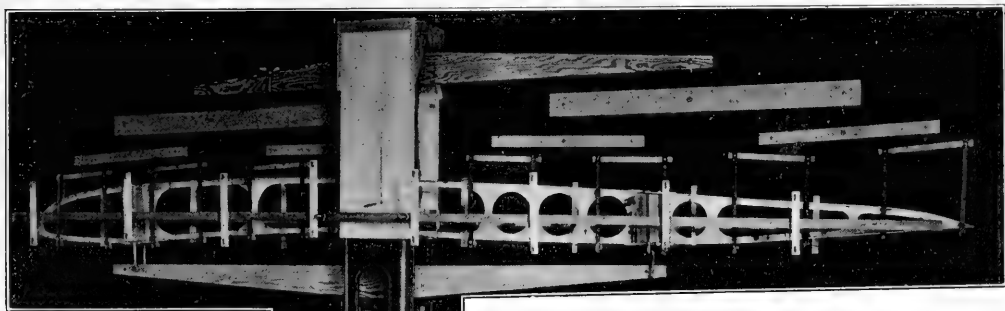
ASSISTANT FORESTER, U. S. FOREST SERVICE

THE war has been full of surprises in its use of wood.

The first year brought a wonderful change in the form of trench warfare, which carried with it an unprecedented demand for wood in many forms, a demand which, according to one French authority, utilized in some cases as high as a cubic meter of wood per linear meter of front. The requirements for airplanes established entirely new standards, which extended practically from the selection of the tree in the woods to the inspection of the final product in the completed plane. The commonplace wooden box assumed sufficient importance in connection with the general question of packing to warrant the formation of a special unit in the General Staff and later on in all of the bureaus of the War Department. Charcoal in many special forms, developed through the efforts of large numbers of research agencies in many countries, was a primary requisite in defensive

ties. Gradually the work has been gaining momentum. While the thought of preparation for war did not enter into it materially, the experience of the past year and a half has shown that in research the best preparation for peace may be a long step forward in effective preparation for war. A great volume of data was accumulated concerning the stand, distribution, and quality of our forests, concerning both technical and economic problems of production and manufacture, and concerning the mechanical, physical, and chemical properties of wood and how best it can be conditioned and utilized for many purposes. An organization of experts was developed which served as a splendid nucleus for a large expansion and which has supplied an invaluable background of knowledge, training, experience, and outlook.

The expert knowledge of wood and its problems gained through years of research frequently enabled the Forest



gas warfare and drew a large part of its raw material from the tropics.

Requirements for wood and wood products were subject to rapid change. Nothing was acceptable because it had been done that way before, and men who adhered slavishly to precedent were swept aside in the fiercest competition for progress and excellence the world has ever known. The demand for correct technical practice extended from the simplest uses to the most complex, from the pick handle, the wooden box, and the gunstock to the highly complicated airplane.

Some thirty years ago the Forest Service began the development of forest research as one of its earliest activi-



A METHOD OF DETERMINING THE STRENGTH OF AIRPLANE WING RIBS

An approximation of the air pressure in flight is secured by applying the load at many points by the system of levers. This method of testing has also been used to develop the strongest and lightest designs.

Service to anticipate problems long ahead of the men responsible for the utilization of results in the military departments, and the general purpose of the Service during the war has been to use its research organization to help wherever help was needed and to seek out the opportunities without waiting for formal requests. The activities of the Forest Service, first and last, dealt with practically every use of wood in modern warfare—aircraft both heavier and lighter than air and for both land and sea, wooden ships, military vehicles, boxes and crates, containers and packing in general, lumber and structural timber, offensive and defensive gas warfare, grain alcohol, acetate of lime, pulp for explosives, hardwood distillation for various purposes, wooden limbs, fiber board, wooden pipe, implement handles, rosin for shrapnel, and naval stores products, tannin, noseplugs for shells, and various pulp products.

In order that the results secured might be known and used co-operative relationships were established and maintained with practically every one of the numerous Governmental agencies which dealt with the war: In the

War Department with the General Staff, the Bureau of Aircraft Production, Ordnance Department, Quartermaster General, Surgeon General, Engineer Corps, and Panama Canal; in the Navy Department with the Bureaus of Construction and Repair, Steam Engineering, Yards and Docks, and Supplies and Purchase; with the Shipping Board, Fleet Corporation, Fuel Administration, Director General of Railroads, Advisory Commission of Aeronautics, War Industries Board, War Trade Board, with several of our Allies, and with large numbers of war manufacturers.

Advice and assistance were rendered members of these organizations on foreign and domestic timber resources, their location, quality, production, and means of increasing production, on manufacturing processes, on the strength properties of wood and physical and chemical properties, the best substitutes, methods of drying, storing, finishing, and preserving woods, preparation and review of specifications, inspection and the training of men, and finally, on various economic questions relating to the wood-producing and wood-using industries. The activities of the organization in addition included whatever field and laboratory investigations were necessary to secure basic information.

Many things have been given

the credit for winning the war—food, ships, money, and occasionally even fighting men and guns. No one questions the place of the airplane. The field was so new, the requirements so exacting, and so much was needed that the Forest Service centered its research largely on airplane problems. For the airplane the question of artificial drying of wood loomed early as one of first importance. Three-inch green spruce dries in the air in from one to two years. During our neutrality our Allies-to-be practically exhausted the reserve stock of dry Sitka spruce. Airplane authorities insisted that only air-dried stock was acceptable. The pressure of the Kaiser's armies, however, required some other answer. Forest Service kiln-drying specifications reduced the required period by

twelve times, from years to an equal number of months, and the supply of dry spruce lost its sinister place as the controlling factor in airplane construction. These specifications were based on several years' investigative work mainly on other woods and for other purposes, and they have since been checked intensively. Theoretically, properly kiln-dried material should be better than air-dried material for the simple reason that it is possible in properly regulated kilns to maintain optimum conditions throughout the entire period of seasoning, whereas air-drying permits limited regulation only. If practice sustains theory, the result becomes one of first importance. The advantage in strength and toughness per unit of weight of spruce over its best substitutes is surprisingly small; but such as it was England crossed an ocean and a continent to secure her critically-needed supply, and the United States organized for its exploitation

a body of men which in former wars would have been a large army. The work of the past year and a half has demonstrated that properly kiln-dried spruce is in fact stronger than that dried in the air even under the best conditions.

Vehicle makers in the United States before the war depended to a very large extent upon air-dried material. Specifications for escort wagons called for



CROSS GRAIN OR STRAIGHT?

Straight to any but the closest ocular inspection but shown to be worthless for airplane construction by the splitting test, the surest method of detecting cross grain in Sitka spruce. This apparently perfect piece of spruce would probably have broken in the air during the first maneuver.

stock which did not conform to the standard sizes. The accumulated air-dried material on hand was available, therefore, only in small part, and it was necessary to go back to the sawmill to secure what was needed. Oak in large sizes for vehicle manufacture seasons naturally in two or three years. Dry material had to be secured in weeks. The kiln was again the only solution. The industry, however, did not have enough kilns, did not know proper methods of drying, and did not have trained operators. Losses from poor kilns or even good kilns inefficiently operated reached from 10 to 50 and even 100 per cent. The Rock Island Arsenal Record of December 26 shows what can be done by suitable kilns operated by competent men. Spokes for 56" artillery

wheels were dried with a loss of .37 of 1 per cent, spokes for 60" wheels with a loss of .29 of 1 per cent, rims for 56" wheels with a loss of 2 per cent, and rims for 60" wheels with a loss of 1 per cent. But even more important than losses is time, and time has been reduced to one-twelfth. The type of kiln at the Rock Island Arsenal was developed at the Forest Products Laboratory, as were also the methods followed; and the man who assisted in the initial operation was a Service expert.

The drying of black walnut presented similar problems. Air-drying was the rule before the war. The demand for rifles required the use of kilns, and with the kilns came excessive losses. It is reported that one plant adhering to an imperfect schedule lost 60,000 gunstock blanks, valued at \$1.20 each when green, in a single kiln run. Concerns following closely methods developed by the Forest Service have been turning out gunstocks with losses not uncommonly less than 1 per cent.

If the war had continued the supply of naturally-seasoned willow for artificial limbs would soon have been

exhausted. For air seasoning a period of three to five years is necessary. Work under way at the Forest Products Laboratory promises to reduce this period to 60 or 70 days without increase in losses.

A great volume of data on the strength of wood for practically all American species has been built up in the

Forest Service during the past two decades. The number of individual tests amounted at the end of the war to no less than 300,000 and covered 130 American species. These tests were of constant and wide application during the war in airplane construction and for practically every other use where a knowledge of the strength of wood was required. For example, they permitted the preparation of tables showing strength values at 15 per cent moisture content which were adopted by both the Army and the Navy as a basis for the design of all wooden parts of aircraft. These data made it possible to select the species most suitable for airplanes and to be sure of the selection, and made it equally possible to reject unsuitable species. They showed that the variation in strength was so great as to render a considerable percentage of even the best woods unsuitable. By a density

requirement it became possible to insure the selection of the strongest stock. By the admission of specified defects in lightly stressed parts it was possible practically to double the quantity of acceptable stock without sacrificing anything in safety. The latter problem involved little more than the application of data already available and the assignment of one man for a period of about three months. Many thousand men in the woods and at the mills would have been needed to produce the same quantity of spruce.

One country lost many planes in flight because spiral-grained spruce was used in construction. Forest Service tests prevented similar losses on our part by showing where the line between straight and spiral-grained material could be drawn safely. Little was known at the beginning of the war on the strength of plywood as a material. The need for this information was supplied very rapidly by an extensive series of tests which became the basis of all of the present plywood specifications and of plywood strength factors used in airplane design

by both the Army and the Navy. In addition, the tests made it possible to adopt with safety the utilization of more species than had originally been thought suitable and thus prevented the supply of plywood from becoming, as it might easily have become, a factor controlling airplane production.

Further ap-

plications of strength data were found in the design of wing beams and wing ribs. Laminated wing beams, for example, offer the opportunity to utilize a much larger per cent of the spruce cut, a percentage far too low at the best. Special supplemental tests developed types of laminated and spliced wing beams as strong as the solid wing beam of our first planes, and the types developed have been adopted by the Army and Navy. As an example of the special supplemental tests on wing ribs may be cited those for an American combat plane produced in large numbers. The weight of the standard rib was reduced by one-third and the strength per unit of weight was increased three times. The wing so developed was adopted and similar designs were developed for six other Army and Navy planes. Strength tests had a further application in ship timber, and this and other information



Photograph by H. D. Tiemann

DRY KILNS OF THE TIEMANN TYPE

Built in the Pacific Northwest for seasoning airplane stock by the Bureau of Aircraft Production these kilns have a daily capacity of 35,000 to 40,000 board feet of wing beam stock. From some of the charges there was no degrade due to drying. Each of the 24 kilns holds 6 loads similar to those shown.

served as a basis for a comprehensive series of recommendations to the American Bureau of Shipping and the Fleet Corporation on the specifications to be followed in the selection of timber. Special tests of boxes were needed to supplement the strength testing of wood as a material. Fortunately methods and special testing equipment had been developed before the war. In some specifications which involve the construction of hundreds of thousands of boxes the number of woods permitted was increased from 1 to 30. It became possible to use the woods at hand and to make full use of the facilities of box making plants wherever they might be. In addition, nailing, strapping, and construction in general were standardized and adapted to the very severe war requirements in overseas shipments. Redesigns saved enormous quantities of cargo space. Large sums were saved in initial costs. Losses since July 1 at ports of arrival in France are reported officially to be only 15 per cent of those before July 1, and the reduction is due in part to the application of Service investigations.

Another general class of problems of first importance dealt with timber supplies and production. A general survey was made of the timber resources of the United States in order to make sure that our supplies of woods should not be dangerously reduced before provision could be made for substitutes. The best data available were maintained on requirements as compared with current production, and similar data were secured concerning the forest resources of other countries. For special woods and for special purposes, much more intensive studies were required. It was not sufficient to be able to furnish data on the properties, conditioning, and uses of wood in airplanes. If it became necessary to select substitutes for spruce knowledge as to supplies, quality, current production, and the extent to which production could be increased was necessary on those woods which from the standpoint of properties alone seemed to meet requirements. The program on airplane woods included field studies of the eastern spruce, practically equivalent to the Sitka spruce of the Northwest, and also such other possible substitutes as Port Orford cedar, Douglas fir, eastern white pine, Norway pine, western white pine, yellow poplar, western hemlock, silver, noble, white, and lowland fir, and even sugar pine, cypress, redwood, and western yellow pine. The work on eastern spruce was being followed up intensively by the Navy, but work on many of the other species was far in advance of immediate requirements.

Black walnut is the accepted gunstock wood. It had been cut heavily for years, production was not meeting requirements. It became necessary, therefore, in co-operation with the States and other forestry agencies and the Boy Scouts to make a field survey throughout practically its entire range. New sources of supply were found, new producers were interested, and processes of manufacture inspected and supervised to insure the most efficient cutting of the material; for it must be remembered that the black walnut was almost equally needed for airplane propellers. Fortunately, the requirements for these two purposes could be reconciled. Production was more than doubled; and the supply of black walnut was no longer a critical problem when the armistice was signed. Two or three years more of war might, however, have required the use of substitutes.

Demand for tonnage in the transportation of food, munitions, and armies left none for the import of tannin on which we have hitherto depended. It became necessary to increase our domestic production, and as a basis for this a field survey made by the Forest Service indicated necessary lines of action for individual plants throughout practically the entire region of tannin production.

The campaign of many agencies for increased production of wood as a fuel to relieve the coal shortage is not new to readers of AMERICAN FORESTRY. The increase in production is known to be large; and it has relieved discomfort and suffering and helped to keep up the fighting spirit at home.

Many other lines of work can only be mentioned in an article of this length. Various economic questions relating to lumber, pulp, and other important forest and wood-using industries were studied in order to keep in touch with developments in the industries, to anticipate difficulties, and to provide Government organizations with the information which they might need for administrative action. Badly needed materials, such as a satisfactory coating for airplane propellers and waterproof glues primarily for plywood, were developed, as were also methods of inspection and certification for glues in general. Material assistance was given in the technical training of men, for which always the demand far exceeded the supply.

The lessons of the war will become more and more clear as time goes on. But it is already obvious that the nation without timber is handicapped in war as it is in peace. It is hardly possible that another war will find Great Britain practically without forests, and the lesson holds true everywhere. How

greatly, for example, would it have been to the advantage of England, and incidentally to us as well, to have had on her own soil ample supplies of airplane spruce. England will now have another powerful incentive to go into the business of forestry. Obvious would have been the advantages to the United States to have had at home ample supplies of materials known to be suitable for airplane propellers rather than to be dependent, even in part, upon the tropics of Africa, Central America, and Asia.

Local as well as general timber supplies are necessary. In the congestion of our railroads almost the first commodity to suffer was wood. The farm woodlot has assumed a greater importance than ever before. It supplied material for many essential war needs. Black walnut brought as high as \$135 per thousand feet in the tree, locust for treenails \$10 per cord in the tree, and it is to be hoped that these and other wood prices have helped to make owners of woodlots realize that in the production of timber there is an opportunity for profit and service as well.

We ought to know much more definitely what our own forest resources are. In years past there have been many estimates varying in character and intensity and giving results not at all comparable. The time has now come when much more complete data under comparable plans should be secured for the entire country. It is needed in all the forest and wood-using industries as a proper basis for future plans governing their operations. It is needed to stabilize the forest industries in general. It should carry with it the collection of other data on cut-over lands, growth under present conditions and the possibilities of growth, social and labor questions, and in fact the whole range of questions necessary for the formulation of a forest policy for the Federal Government as well as for the States and private interests. We need far more knowledge as to foreign supplies, together with information as to properties and utilization and the economic and trade conditions which influence production and importation.

The war has emphasized over and over again the need for research in all lines of human endeavor. That the lesson is being heeded is shown by such great national research movements as those under way in England. With the need ahead for growing all the timber that we use, as it must be now in much of Europe, rather than depend upon virgin supplies, the technical basis must be supplied through forest research. There will undoubtedly be a vastly increased program of industrial research in the United States, and this program should include the whole range of investigations covering the properties and utilization of forest products. Industries, certainly for their profits and possibly in some cases almost for their existence, will be dependent upon the investigative efforts which they make for themselves or those which are made for them by other agencies and the results of which they apply. Investigations to determine the properties of materials and the best methods for their manufacture and use are going to have a very decided bearing on the extent to which these materials hold their place in after-the-war competition. No industry can count on holding for its products any field which it has formerly occupied. This holds true of wood and the forest and wood-using industries as much as any others. It is going to be a question of competition all along the line, beginning with the use of land, then between materials and industries in our own country, and finally, as a part of the struggle friendly or otherwise, with other nations.

AMERICAN LUMBER FOR NORWAY

THE first shipment of American house-building materials, ever sent to the wood-producing nation of Norway has just recently gone forward, according to an announcement from the Bureau of Foreign and Domestic Commerce. It is declared that the shipment is the beginning of a lumber trade which promises to develop to important dimensions.

A New York correspondent of the Bureau reports a recent trip to Louisiana where he purchased about 120,000 feet of yellow pine in the different dimensions suitable for wooden buildings, and says that the shipment was made direct to Norway from New Orleans. Another order half the size quickly followed.

The correspondent also tells of having placed orders for high-class carved interiors in quartered oak, mahogany and satinwood for homes to be erected in Christiania, as samples of American lumber building materials. Stocks of such materials are to be carried at Christiania, Bergen and Trondhjem by a company now in process of organization.

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"I shall stay with you as long as I can. Your magazine is O.K. and my wife enjoys it as much as I do. We are keeping them all for future reference."—*Pat Whelan.*

"The January number of AMERICAN FORESTRY is before me and as a devout lover of the great-outdoors, and especially the trees, I want to add my bit of praise to this most interesting issue. The appearance of the paper, the interesting articles and above all the beautiful and luring pictures are indeed worthy of commendation."—*C. E. Davidson, Editor Dealer's Bulletin.*

"Permit me to offer my hearty congratulations on the February number of AMERICAN FORESTRY. The cover is attractive and the contents are so varied that every one who has a spark of love for outdoors can find something worth while that is of special interest to him. You are setting a fast pace for yourself if the magazine is to continue to improve as it has in the past. Go to it, and the best of luck."—*Joseph W. Tatum.*

"Just a line to let you know that in my estimation, you are making a wonderfully fine magazine. It is getting more attractive and valuable each month, and I am sure for you it must be a thing of beauty and a joy forever."—*D. E. Beasley.*

"I want to express my particular delight in the February AMERICAN FORESTRY which has just come to my desk. You surely have succeeded in making a readable magazine."—*J. Horace McFarland.*

"I have had in mind to write you for some days past, inquiring about Glacier National Park, and incidentally to compliment you on the AMERICAN FORESTRY. I think it fine."—*C. A. Lightner.*

"I wish to comment on the unusually interesting and instructive character of the magazine, which the present management has developed to a point of unusual excellence."—*Henry Crofut White.*

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

On January 29, 30 and 31 were held in Montreal the most interesting and best attended Forestry, Lumbering and Pulp and Paper meetings ever held in Canada and it is doubtful if any such get-together meetings of foresters and lumber and paper men were ever held before on this continent. The papers and discussion were all of a most practical nature and showed a strong spirit and desire for co-operation.

The meeting of the Canadian Forestry Association showed that body to be in a most flourishing condition, with nearly one thousand new members and a record of much useful work for the past year. Addresses were made by Major Barrington Moore, of the United States Forest Service on the work of the American Forestry Units in France and by F. J. Campbell, President of the Canadian Pulp and Paper Association, and W. Gerrard Power, President of the Canadian Lumbermen's Association. The only new officers elected were Clyde Leavitt, Forester of the Commission of Conservation, as Vice-President, and P. B. Wilson, of the Spanish River Pulp and Paper Company, as a Director.

The attendance at the meeting of the Canadian Society of Forest Engineers was the largest since the founding of the Society. The guests were, Major Barrington Moore, F. J. Campbell, Prof. Macarthy, of Syracuse University; W. G. Howard, New York Commission of Conservation; H. R. Bristol, Forester of the Delaware & Hudson Railroad; D. A. Crocker and Mr. Shepard, of the Lincoln Paper Company, and Lieut. H. M. Kinghorn. After the dinner most of the evening was taken up with a discussion of the necessity for forestry research work in the woods, following a most excellent paper on the subject by Dr. C. D. Howe, of the University of Toronto, and a most interesting discussion on forestry education and training. Dr. Howe pointed out very forcibly the lack of accurate knowledge of silvicultural and ecological and biological conditions in the woods and urged that more intensive work along these lines be conducted by studies on the ground and the establishment of sample plots where continuous studies could be made.

The Forestry Conference, under the joint auspices of the Quebec Forest Protective Association and the Woodlands Section of the Canadian Pulp and Paper Association, was opened by the Hon. Minister of Lands and Forests of Quebec, Jules Allard, who said that his Government was anxious to do all in its power to forward the proper

protection and utilization of the forests and their proper conservation. Brig-General J. B. White, D. S. O., who has been in command of the Forestry Corps in France, gave a very interesting talk on his work and on forestry conditions in France and said most forcefully that Canada must begin planting operations at once and advocated the use of returned soldiers for this work. Prof. J. M. Swaine, of the Dominion Bureau of Entomology, read an interesting paper on insect damage to the forests. Prof. Swain has spent several years in field work in the forests from the Atlantic to the Pacific and has done much work of a practical nature. His work shows that now the danger to the forests from insects is greater than that from fire and advocates more careful protective measures, chief of which is the burning of logging debris. He said that the balsam fir was so infested with fungous disease at present and so liable to attacks from borers that it was probably only a question of time before this species would be practically wiped out in Eastern Canada. Mr. Clyde Leavitt read a paper on burning logging debris from the standpoint of fire protection and logging and there were some very interesting discussions in which many practical woods operators took part. A committee of heads of Woodlands Departments was appointed to go thoroughly into the matter and to make actual experiments in burning logging debris under actual operating conditions and to report on the cost and feasibility. Dr. Fiske, of the Life Extension Institute of New York, read a paper on Health in Relation to Business. Lieut. Lewis gave a most interesting talk on the interpretation of aerial photographs, illustrated by actual photos taken at the front. He showed the wonderful possibilities of such photography for making timber reconnaissances, mapping unexplored and difficult country and following the process of logging operations. There is no doubt but that in a short time the airplane will be widely used for these and other purposes. The committees on hardwood utilization and improvement of logging conditions reported and the reports brought out most interesting and practical discussion. The latter committee was continued with instructions to go into the woods and report on as many actual logging operations as possible. Demonstrations of caterpillar tractors and a new, horse-drawn, motor-operated rotary snow-plow were given.

The papers and discussion at the meet-

ings and the discussion carried on informally by the men present seemed to bring out the following conclusions. That the present great need is for some protection against insects and fungi in the forests. That logging methods will have to be improved in order to cut down their cost and to leave the forests in better condition for a second crop. That the present method of cutting to a diameter limit is bad for the forest. That some means must be found to utilize the hardwood from mixed hardwood-softwood forests and that planting on a large scale must begin at once.

The meetings of the Technical Section of the Canadian Pulp and Paper Association and its general meeting were very interesting and largely attended and the latter brought out also the need for forest planting and the recommendation to employ returned soldiers in such work.

The Minister of Lands and Forests of Quebec has offered to contribute to the expense of a sea-plane patrol of timber limits to try out this method and see practically how it will work for fire-protection and for making maps. He has also asked the Quebec Limit Holder's Association to send a delegation to see him to discuss a law to be introduced at the 1920 session of the legislature to encourage forest planting. Such a law has been drawn up by a committee of the Association and was submitted to the Minister on the twelfth of February.

Mr. Piche, Chief Forester of Quebec, has written that he met Mr. Ridsdale, Executive Secretary of the American Forestry Association, in France and that they are both working to help reforestation in that country. He also says that everyone in Paris is talking English and that the "poilus" are making English "communiqués" to their English and American comrades-in-arms.

H. M. MacMillan, who has been assistant to Major Austin Taylor, in the splendid work of the Imperial Munitions Board in getting out airplane spruce in British Columbia, will soon finish with that work. MacMillan's record as Chief Forester of British Columbia, as Canadian Trade Commissioner to the Far East and in the Spruce Production Division has been one of which he may well be very proud.

R. D. Craig, another forester, also did good work in charge of the Spruce Inspection.

The Riordon Pulp and Paper Company have agreed to continue their contribution to the co-operative investigative work being carried out by the Commission of Conservation under the direction of Dr. Howe.

The St. Maurice Paper Company of Three Rivers, Quebec, have commenced mapping and estimating their timberlands. The work is being carried out by Mr. Galarneau, chief forester, assisted by Messrs. Nix and Terry.

The Hon. A. E. Smith, Minister of Lands of the Province of New Brunswick, gave a most interesting talk on his work in putting the administration of New Brunswick's forests on a sound and scientific basis and in taking it out of politics. He made the statement that after their survey and estimate was completed that if he found it necessary to curtail the cut in that Province for the sake of perpetuating the forests that he would certainly do it. New Brunswick and Quebec are running a neck and neck race in the work of putting their forestry administration on a sound and enduring basis.

It looks as if it was "up to" Ontario to make a move for the placing of its timber sales branch under the direction of the forestry branch and to begin a survey of its forest resources.

The Timberman, in its January issue, describes a method in use in Sweden by which branch wood and other wood up to four inches in diameter is cut up by a machine into pieces and burnt like coal. This proved very successful where too deep a layer was not placed on the grate and shows a way in which much wood now wasted could be utilized.



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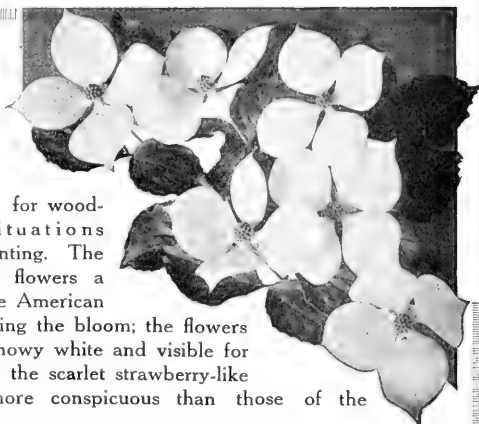
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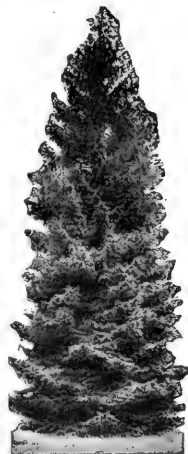
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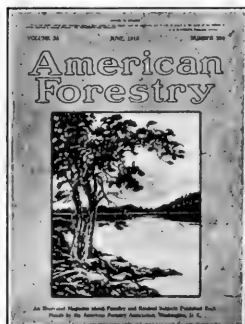
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IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

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THIS YEAR'S WORK OF THE NATIONAL WAR GARDEN COMMISSION IS GOING FORWARD WITH INCREASED VIGOR. THIS COMMISSION STANDS READY TO CO-OPERATE WITH EVERY ORGANIZATION AND INDIVIDUAL INTERESTED IN HOME VEGETABLE GARDENING AND IN HOME CANNING AND DRYING.

BY REASON OF CLOSE AFFILIATION, THROUGH ITS CONSERVATION DEPARTMENT, THE AMERICAN FORESTRY ASSOCIATION HAS DIRECT INTEREST IN THE SUCCESSFUL WORK NOW BEING CONDUCTED ON AN INTERNATIONAL SCALE BY THE NATIONAL WAR GARDEN COMMISSION. MEMBERS ARE URGED TO SEE THAT THEIR FRIENDS ARE SUPPLIED WITH SUCH OF THE COMMISSION'S FREE PUBLICATIONS AS CAN BE PUT TO GOOD USE. THE BOOKS COVER VEGETABLE GARDENING AND HOME STORAGE, HOME CANNING AND HOME DRYING OF VEGETABLES AND FRUITS.

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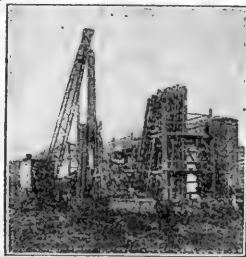
Percival S. Ridsdale, Secretary

American Forestry



PHYLLIS
C. SMITH

An Illustrated Magazine about Forestry and Kindred Subjects Published Each Month by the American Forestry Association, Washington, D. C.



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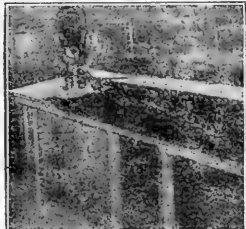
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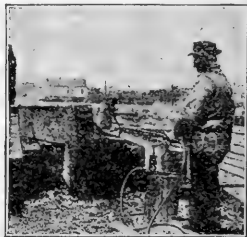
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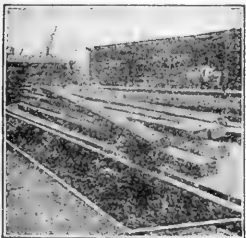
The Open-Tank Process: Simple wooden tank lined with sheet-iron equipped with steam coils and small derrick.



Spraying roof deck of box car with Carbosota Creosote Oil (no paint used).



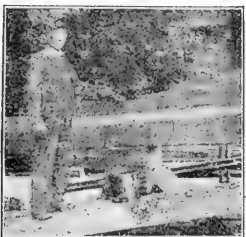
Spraying: Applying Carbosota to ends, mortises, and tenons (points of contact) of caps and stringers for timber.



Creosoting car sills by open tank process.



Brush-treating pole. Note use of a mop, which is more satisfactory than a brush.



Brush-treating laying surfaces of ship timbers with Carbosota.



Home-made creosoting tank, built of common lumber lined with galvanized sheet iron soldered at the joints.



Faying surfaces of timbers brush-treated with Carbosota. (Courtesy Peninsula Ship Bldg. Co.)



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Exceptionally artistic effect resulting from the use of Carbosota Creosote Oil as a paint.

AMERICAN FORESTRY

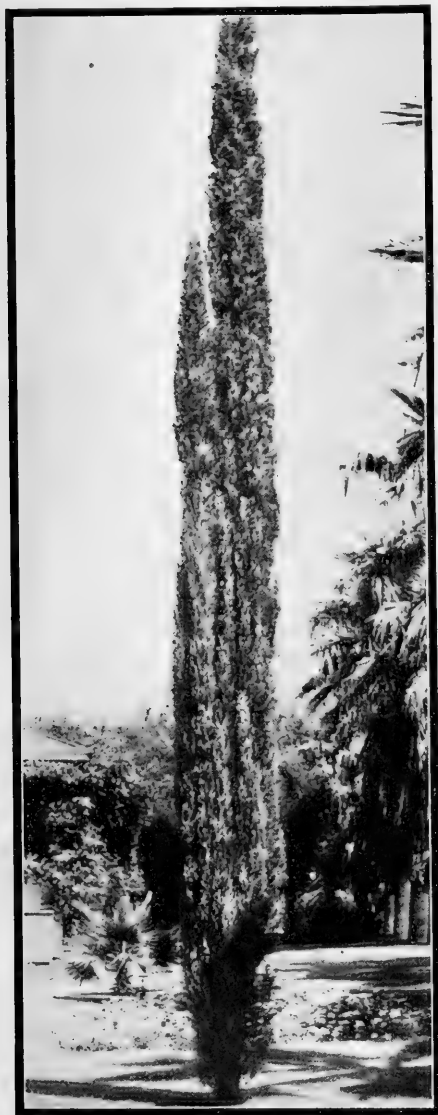
THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

APRIL 1919 VOL. 25

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ITALIAN CYPRESS

This beautiful tree is a native of Europe and Asia. It is a tall, very slender, tapering tree, with branches lying close to the stem. Often used to line a driveway or enhance a vista, it is most adaptable for landscape work. (Photograph by courtesy of the California Nursery Company.)

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TREES HERE DOING A DOUBLE SERVICE

These trees not only hid advancing French and American troops from enemy flying machine observers, but provided lumber for such dugouts as are seen. Comparatively heavy timber covered with earth provided fairly good protection from the enemy shells and forests and woodlands were always shelled because they were used to conceal troops.



CANADIANS GETTING OUT HEAVY TIMBER

Heavy timber such as shown in this photograph was used for piling, bridge building, canal repair work, etc., by the Allies, while the Germans cut quantities of it to roof dugouts. These heavy timbers covered with several feet of earth made the dugouts safe from even the heaviest shells.

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APRIL, 1919

NO. 304

FRENCH FORESTS FOR OUR ARMY

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

This is the second of a series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France, and Belgium in December, 1918, and January and February, 1919, taken for the purpose of investigating war-time forest losses and of ascertaining how best America can aid in restoring the forests of our Allies.—EDITOR.

TOURS, FRANCE, January 30, 1919.

HERE is the headquarters of the 20th Regiment of Engineers composed of lumbermen and foresters, the largest regiment in the world, and the organization upon which the American Expeditionary Force depended for its lumber for war needs and for its fuel wood. Here, since the organization was completed by the merging of the two battalions of the 10th Regiment, mostly forestry troops, with the 20th Regiment, mostly lumbermen, Col. James A. Woodruff, a West Pointer and regular army officer, has been in command, with Lieut.-Col. W. B. Greeley, of the United States Forest Service and a director of the American Forestry Association, assisting him in directing the operations.

Tours, being the headquarters for the S. O. S., —the Service of Supply—for the A. E. F., and being the concentration station for the supplies which are landed at Bordeaux, St. Nazaire and Brest, became the natural place to locate the directing forces of the 20th Regiment which supplied the troops with so much of the material which they needed in railroad, camp and trench construction.

Here it was possible not only to secure information regarding the work of the regiment but also, by automobile to visit some of the lumber camps to see the conditions under which the boys worked. The information received, the impressions secured, the conditions experienced I pass on to the readers of AMERICAN FORESTRY

Magazine, not so much in the effort to give a detailed account of the accomplishments of the regiment, which will come in later articles, as to convey to them outstanding facts which should be of the most general interest.

First then the feature which attracts attention at once, the fact that it is the largest regiment in the world:

The regiment is composed of 49 companies of approximately 250 men each, divided into 14 battalions and having connected with it 36 Engineer Service Companies or labor troops. The regiment originally was organized to contain 48 companies, but the 49th was added in France, being composed of members of the New England Saw Mill Unit who had spent almost two years in cutting in the Scotch forests. Three officers and 90 men of this Saw Mill Unit volunteered as a

FRENCH FOREST LOSSES

\$800,000,000 is the general estimate of the war losses and loss in reproduction value of the destroyed forests of France. It is estimated that 16,960,000,000 board feet of saw timber have been felled in the French forests since the war started. Nine-tenths of this timber was used for military purposes. In addition, military operations have destroyed 2,544,000,000 board feet, while the Germans confiscated 2,968,000,000 board feet. The total estimated drain on the French forests is, therefore, some 22,472,000,000 board feet. It would take France fully one hundred years to fully recuperate from these forest losses, for the productive capacity of the French forests has been reduced about 424,000,000 board feet a year over a very long period. Devastated forests in France cannot be put to agricultural uses because the soil is of such a quality that under French economic conditions the forest crop is the most profitable one that will grow upon land assigned for forest production.

nucleus of the 49th Company of the 20th Regiment and the full complement of the company was secured by getting men from other organizations.

The chief forest cutting of the regiment was in the Vosges section with Epinal as the headquarters of the operating companies. The forests there were chiefly of Scotch pine, fir and spruce. At Eclaron was the largest single installation, a mill capable of shipping, as it did, an average of five thousand ties a day. This mill was situated in the forests of Argonne and furnished lumber, largely duck boards, bridge timbers, piles and poles, etc., for the 1st and 2nd Armies. Colonel C. S. Chapman,

with headquarters at Neufchatel had entire control of this advanced section and of all the operations in the departments of the Vosges, Doubs, Cote d'Or and Aube, so that his work consisted of supplying all the requisitions in the zone of active operations for the A. E. F.

The Eclaron mills were situated near some big ammunition dumps and as the plant was run all day and all night, being electrically lighted, it made a very good target for the German bombers. The mills were bombed several times but none of the workers were injured nor was much damage done, and finally a real American trick resulted in so misleading the German bombers that the danger was entirely overcome. This trick was devised by

Major Spencer who, realizing that the electrically lighted mill was a bright target for the German bombers, ran electric wires into the heavy woods for a distance of one-third of a mile from the mill and installed a number of electric lights on the trees. Whenever an alarm of an air raid came, the lights of the mill were extinguished and the lights among the trees one-third of a mile from the mill were lighted by switching on the current and were kept blazing while the

Germans wasted bombs on them and inflicted damage only on some of the trees.

Other mills up along the fighting front were also bombed frequently, but without serious damage.

The amount of wood required by an army for fuel, in winter especially, is not appreciated by the civilian. For instance, at the time the armistice was signed, Lieutenant-Colonel A. S. Peck, assisted by Major R. J. Stuart, Captain Donald Bruce, Captain Joseph Kittridge, Jr., some twenty lieutenants and twenty sergeants of the 20th had charge of 10,000 quartermaster troops, all colored,

cutting fire wood for the 1st and 2nd American Armies, at the fighting front, with headquarters at Chaumont. These men, cutting hard-wood coppice, and using transportation on forty and sixty centimeter railroads, by wagon truck or any other method of carriage available, and working always to get the wood cut as near the location of the troops as possible, managed to secure and maintain a daily production of about 3,000 cords of wood a day. This amount of wood supplied fuel for approximately 1,000,000 troops.

The first mills used by the regiment when its first units reached France were French mills, but their daily production was so low that the units changed to American

built mills as soon as possible, and within a few months all of the mills in operation were using machinery sent from the United States.

At the time the armistice was signed, the regiment had eighty-one lumber mills in operation and twelve more being installed. The average value of these plants was \$15,000 apiece. When I was in France the sale of these saw mills and their machinery, which were of course of no further use to the American Army, was somewhat retarded, if not

wholly prevented by army red tape. As one officer intimated, Congress is evidently afraid to trust an army officer to sell any army material, or so one might be led to believe, as the Act regarding the sale of army material provides that the sale price shall include not only the original cost, but also the cost of installation. As a result, many of the lumber mills will probably have to be scrapped and sold as scrap, if the officers of the 20th Regiment do not manage to get special permission to sell them at the best prices they can obtain.

The men of the regiment with whom I came in contact



WEAVING SUPPORTS FOR SIDES OF TRENCHES

This photograph shows the manner in which brush and small trees were used to prevent the earth on the sides of the trenches caving in. Great quantities of these mats were used by the Germans as well as the allied armies.

at the lumber camps were in good health and fine physical condition, despite the generally disagreeable weather conditions of the winter months, their hard work and the fact that much of their labor was performed in the rain and mud. The majority of them had put on weight, which is not surprising when one considers the fact that they are unusually well cared for, particularly as far as their physical condition and their diet is concerned. After their ten hours of hard work each day, they return to their lumber camps, strip off their wet and muddy clothing, have hot showers with plenty of water and an entire change of dry clothing

for the evening. Their diet is somewhat larger than that of the men in other units, on account of the very hard work which they do. I believe the increase in ration

above other units is about seven per cent, and some of the officers stated that a ten or twelve per cent increase was most desirable. At any rate there seemed nothing lacking in the mid-day dinner which I had with Lieutenant-Colonel Greeley at the camp at Chenonceaux, where the 29th Company, in charge of Captain J. H. Price, was located. Here we had pot-roast, cut thick and

piled high on the platter, rich gravy and plenty of it, potatoes, macaroni and tomatoes, canned cherries, con-



EFFECT OF SHELL AND RIFLE FIRE

This was once a standard under coppice forest near Ribercourt and on the route to Lassigny. It was practically totally destroyed by the heavy firing during a prolonged battle.



FOREST CASUALTIES LIKE THESE ARE SEEN ALL ALONG THE FIGHTING FRONT

Wherever there has been a severe military action in woodlands or forests the trees have suffered much as these have. The scene is near Verdun and heavy shell fire swept the woods.

densed milk, sugar, butter, and a large thick peach pie, cut only twice, making each portion one-quarter of a pie, and a real American pie at that. So husky and vigorous are conditions that despite their ten hours of hard work during the day, their favorite recreation at night is in some athletic exercise or game.

At first the men were rather well crowded together, a few large barracks being erected at a camp and usually sixty men being assigned to each barracks. Later, however, it was found that the men were better contented and kept in better health by being separated in squad tents, or small

barracks, with eight men to a squad. This arrangement greatly facilitated the isolation of ill men. The squad tents were boarded to a height of four feet and well

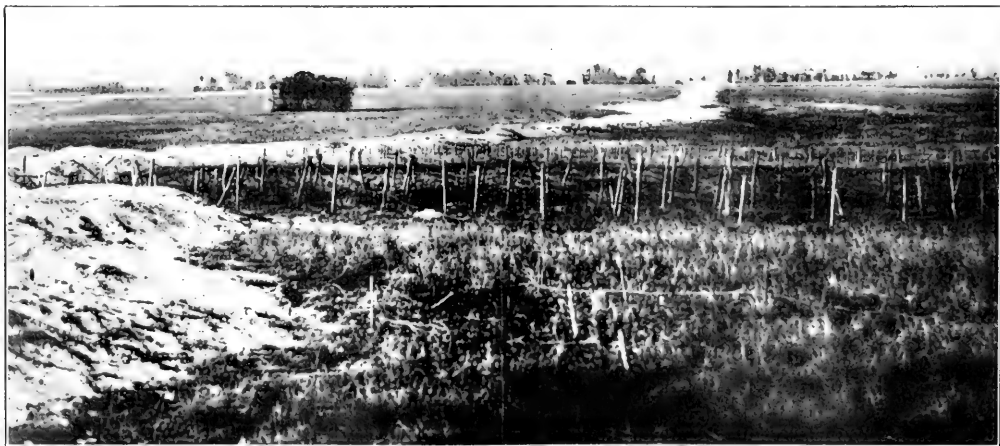
sodded and floored. Each had a small stove, was equipped with six or eight bunks and was easy to keep warm and dry and comfortable. In some camps where tents were not to be had, huts were built and served the same purpose.

Various units of the regiment performed particularly good work during the September drive of the Allied Armies which forced the Germans back so quickly. During one day's operation, the American fighting



CUTTING AND SHARPENING BARBED WIRE STAKES

These stakes or poles from five to six feet in length used for supporting barbed wire entanglements were cut by the hundred thousand for use not only on the fighting line, but for second and third line defenses



SMALL POSTS USED FOR WIRE ENTANGLEMENTS

Many hundreds of thousands of these posts were cut by the contending armies and on them was stretched thousands of miles of barbed wire. The line of trenches is indicated by the whitish soil. Many miles of such trenches formed lines of defense between the German advance and Paris



A HEAVILY SHELLED ROAD NEAR RIBERCOURT

Here the automobile in which the writer toured the battlefield was stuck in a shell hole for six hours. A terrific battle had been fought over this ground, thousands of tons of war material was scattered in the fields and woods and within sight was an old quarry which housed several thousand German troops.

troops captured three rail heads and the immediate problem was to provide enough ties to connect these rail heads with the French railroads nearest to them. Thousands of ties were needed but by hard work with every available man, the Forest units assigned to the task of providing the ties, secured the desired number in a remarkably short time.

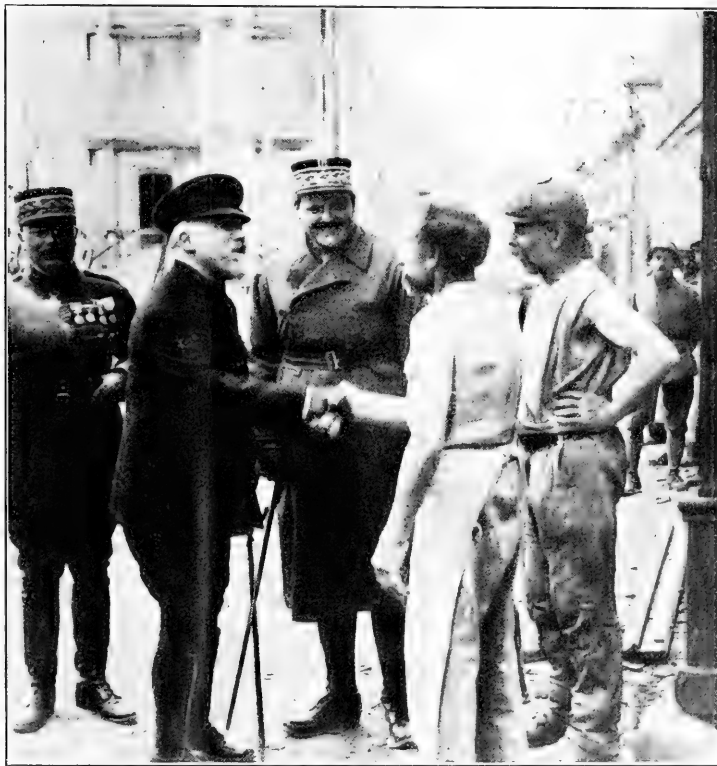
The 7th Battalion, which was placed at the disposal of the French Government, manufactured entirely free of cost to the French Government, the following quantities of timber: 4,468,000 board feet of lumber; 199,808 standard gauge ties; 191,604 narrow gauge ties; 127,475 poles and props; 54,647 steres of fuelwood. This is enough to build 665 barracks; 195 miles of railroad; 1,595 miles of telephone line on the basis that half the round material was poles; and warm a detachment of 500 French Infantry 150 years.

The casualties of the regiment were, of course, not large, as most of the men worked in sections far behind the range of German guns. Among the casualties, however, are those of

two officers, Captain Harry H. MacPherson and Captain Wilford A. Fair, who were killed by German machine gunners on October 5, 1918. These men were looking for mill locations in the Argonne forests. In some manner the Germans got behind the troops in the advanced section during the night and the next morning as the two officers walked through the forests, hidden German machine gunners fired upon them. MacPherson fell, badly wounded and Fair gallantly ran forward to aid him and was killed as he knelt over his dying fellow-officer. Captain Fair was cited for gallantry.

First Lieutenant John H. Kelly was killed in a motor smash-up. Master Engineer George L. Nutter and Sergeant Alcott were killed at St. Julien by a railroad train while doing a rush loading job.

The influenza was serious at two or three camps and several men succumbed. At the Mimizan camp in the Lands Dis-



THE PRESIDENT AND THE BAKERS

When President Poincaré of France visited Chateau Thierry after the American troops drove out the Germans he complimented the bakers of the town upon their successful efforts to provide bread for the civilian population.



LUMBER USED IN TRENCH CONSTRUCTION

The sides of this trench of an advanced post of French troops along the Marne are braced by small branches woven together and nailed upright of two and three inches in diameter. The dugout is roofed with heavier timber. The trench shows the damage done by a German shell which exploded in it.

trict the 11th Company had a number of cases and fourteen deaths, among the dead being Corporal Charles J. Cumisky, who devoted himself to attending the sick men without thought of his own physical condition. Even after he had been stricken with the disease, he continued to work and finally fell exhausted and died shortly afterward. He was recommended for a Distinguished Service Medal.

Within an easy run from Tours by automobile, one may see scores of fine old chateaux, and among the most interesting of these is the Castle of Chambord. In the extensive grounds attached to the chateau, a considerable amount of forest cutting was done. The story of the arrangements for this cutting is interesting.

The castle was built during the sixteenth century as a hunting lodge for the Royal family and in order to keep the game in and to keep the poaching peasants out, a wall some ten or twelve feet high and about two

feet thick, and twenty-one miles in circumference was built and is still standing and in good condition. When the war broke out this property, which is owned by an Austrian nobleman, was taken in charge by the French Government, under somewhat the same conditions as the Alien Property Custodian of the United States took charge of the property of aliens here, and as it contained some fine stands of pine, portions of its forests were leased to the American Forest Units and were cut.

To appreciate the manner in which the French, British, Canadians and Americans co-operated in the purchase of forests and in their lumber production it must be remembered that as early as September, 1916, because of increasing difficulties of transport, the British Army decided it would be necessary to secure its timber supplies in



THE WELL KNOWN DUCK BOARD

Each army made great quantities of these duck boards for the bottom of trenches and for muddy and slippery ground back of the trenches. The British, after the armistice was signed, manufactured 1,000,000 of the ten foot lengths on which the duck boards were nailed. These cost seven francs each and the British expected to sell them for no more than one franc each.

France. Accordingly, General MacDougal, head of the Canadian Forestry Corps, secured mill equipment and forestry companies to handle the exploitations. The forests were supplied free of charge by the French in return for certain tonnage which France required for the transport of raw materials.

It was not until September, 1917, that the Comité Franco-Britannique de Bois de Guerre was organized by Lieutenant Sebastien, to handle the acquisition of stand-

name of the committee was changed to Comité Interallié des Bois de Guerre. The work of the larger organization was transacted by an executive committee composed of Lieutenant Sebastien for France; Colonel John Sutherland for Great Britain; Lieutenant-Colonel John Lyall for Canada, and Major T. S. Woolsey, Jr. (for standing timber) and Major Barrington Moore (for lumber, etc.) for the United States.

This committee which met twice a week, purchased all standing timber outside the army zone, for the British and American armies, and later was joined by a Belgian delegate, Major Parlongue. Timber purchase in the war zone, which consisted chiefly of fuel, was conducted by Lieutenant-Colonel Peck working through the French Mission at Chaumont at which city General Pershing established the American Expeditionary Force headquarters. Major Badrey, of the French Forestry Service,



THE FRENCH GAS MASK

Wood workers were often so close to the fighting that they had to wear gas masks for protection while gathering fuel wood or securing stakes for barbed wire.

ing timber and the purchase of manufactured lumber from Switzerland and other countries for the British Service. This Executive Committee worked under the supervision of General Chevalier, Chief of the Inspection Generale des Bois, under the Ministry of Armement, which controls all the wood centers of France.

When Lieutenant-Colonel Graves, Chief of the United States Forest Service, arrived in France to organize the American Forestry Section, one of his first decisions was to join this wood committee in order to avoid competition with other army services in France, and in order to reap the benefits of an efficient existing organization. Accordingly, in September, 1917, Colonel Graves was appointed American Delegate to this committee, and the



THE FRENCH CUT LOW

With true French thrift applied to forest cutting the French forests left stumps as low as cutting with axes or saws permitted.

was attached to this mission for the express purpose of facilitating these purchases.

Under an agreement between France and England, France supplied the standing timber, while England supplied the equipment and personnel, for manufacture and transport to the railways. When the Americans joined the C. I. B. G. the British were established in the Landes, Normandy, and in the Vosges-Jura. In addition there

were a few pole operations in central France, south of Orleans. Since this latter area was on the American line of communication, the British kindly withdrew their operations and ceded this area exclusively for American exploitation. One of the first problems was to define purchase areas for the use of the American or British services—the French retaining the right to purchase in all portions of France.

The Landes was divided so as to facilitate British water transport from Bordeaux and Bayonne to a port in northern France close to the British front. This arrangement was necessary because of shortage of rolling stock in France and the difficulties of transporting wood materials

tion, the A. E. F. undoubtedly would have paid far higher prices for their timber and would have had greater difficulty in securing it. According to Major Woolsey, of the 20th Regiment, the A. E. F. owes a debt of gratitude to Lieutenant-Colonel Sutherland and Lieutenant Sebastien of the C. I. B. G., for their co-operation. Lieutenant Sebastien, the head of the C. I. B. G. Executive, worked tirelessly in the interests of the Allied timber supply, not only having charge of the purchase of standing timber in the S. O. S. of France, but also negotiating important purchasing agreements with Switzerland, Spain, Portugal and Scandinavian countries. Repeatedly, when the situation demanded, Colonel Sutherland withdrew his claims



A PONTOON BRIDGE ACROSS THE MARNE

The rapidity with which these bridges are built when the lumber for the pontoons and for the bridge makes it necessary for the forestry units to be prepared to fill quickly all demands for pontoon lumber

from Bordeaux north on the American lines of communication.

Similarly the Vosges and Jura timber areas were divided between the British and Americans so as to interfere to the least possible extent with their railway transport. The Vosges-Jura exploitations were particularly important for France since she secured a large per cent of her aviation material, manufactured by the Canadians, from the splendid spruce forests that make this region one of the most valuable in France. Normandy being near the British front was reserved for them.

Had it not been for the British and French co-opera-

tion, the A. E. F. undoubtedly would have paid far higher prices for their timber and would have had greater difficulty in securing it.

On account of war speculation, the price of timber in France had more than doubled since the beginning of the war. In the Jura, timber which before the war brought \$16.00 per thousand feet on the stump sold for from \$32.00 to \$45.00 per thousand feet, counting 3½ cubic meters of standing timber as equal to one thousand board feet.

It was owing to the assistance of Lieutenant-Colonel Joubaire, chairman of the French committee having charge of the purchase or leasing of private forests, that

the A. E. F. was able to purchase private forests at even less than the current market rate. Colonel Joubaire unquestionably saved the United States more than a million dollars because of his skill in treating with private owners.

value, which arose to two or three times the pre-war value. The sale of private forests and the prices for them were fixed by a Committee from the Board of Armament, and it is interesting to note that the prices



FRENCH FORESTRY TROOPS

There is no waste in this kind of cutting nor is there any waste in disposing of tops and small branches. These are either used by the soldiers for fuel wood or civilians pay for the privilege of gathering them for fuel.

Take this as an illustration: One of the first forests operated by American troops—the Forest of Boisgenneau—was offered for \$800,000 by an Italian speculator, and when the C. I. B. G. saw that the price was exorbitant the forest was immediately requisitioned for war needs. The appraisal of Colonel Joubaire on the value of the forest was secured and the final purchase price was close to \$140,000 as opposed to \$800,000 originally asked. In innumerable cases, where the demands of private owners have been exorbitant, as they almost invariably were, Colonel Joubaire was able to reduce the price to an equitable figure. When it is considered that the A. E. F., when the final settlement is made, will have purchased some \$10,000,000 of standing timber in France, the importance of the co-operation secured through the C. I. B. G. can be fully appreciated.

About 40 per cent of French forests are State forests, about 20 per cent Communal and about 40 per cent private. The prices for the State and Communal forests were fixed by a Committee of the Department of Agriculture and the stumpage prices were based on the market

for these private forests were about fifteen per cent below the prices fixed by the Committee of the Department of Agriculture. Some private forest owners desired clean cutting, so that they might take every possible advantage of the prevailing high prices for their timber. Others with an eye to future production permitted cutting on a forestry basis only, while all the cutting of State and Communal forests was entirely on a forestry basis and was so regulated that on the average the productive value of such forests was restricted not more than five years.

As France, prior to the starting of the war, imported about 1,484,000,000 board feet of manufactured material more than she produced, the French shortage must now be met by continued over-exploitation of her forest resources, by commercial imports, or by imposing a refund of German timber from German forests.

Over-exploitation is, of course, impossible because if continued it would bring erosion, floods and unfavorable climatic conditions, and would destroy local wood industries upon which many thousands of French people

depend, in a considerable measure, for their livelihood.

Importation is undesirable because of the high cost.

What the French prefer and advocate, is a provision in the Peace Treaty for compelling Germany to refund to France the amount of timber destroyed in France. That Germany is capable of doing this is evident as she is rich in forest wealth. Her total wooded area amounts to almost 35,000,000 acres and her annual production, exclusive of fire wood, is about 8,500,000,000 board feet.

erage and vehicles. Large lumber such as yellow pine, Douglas fir, etc., is desired for bridge, railroad and canal repair and construction. Most of the construction lumber and general lumber which she may need can be supplied from her own resources and after a short time may be secured from the Baltic region at lower prices than she could secure the same lumber from America. Finland has a quantity of lumber ready to ship and lacks only the shipping. This timber is from forests cut on about



WORK FOR FOREST REGIMENT UNITS AND BRIDGE ENGINEERS

The Germans destroyed this bridge in their retreat from Chateau Thierry and pontoons made of lumber produced by the 20th Regiment units near the fighting line and constructed by bridge engineers were needed for the troops advancing in pursuit.

Lumbermen of the United States are naturally curious to learn of lumber trade possibilities in Europe, and it was therefore interesting to secure information regarding the possibility of American lumber finding a market in France. Some inquiries revealed the information that there is a possible market for hardwoods of the best grade for interior work, parquet flooring, furniture, coop-

a fifty-year rotation period. The American lumbermen must realize the necessity in developing a market abroad, of taking advantage of the Webb Law, establishing agencies, meeting earnest competition and making a market for the sale of their best material to the high-class trade by using clever salesmen earnestly advertising their goods and quickly meeting the market conditions.

CASCARA STUMPAGE ADVERTISED ON SIUSLAW

THE first advertisement of cascara-bark stumpage on the National Forests is now being run. The advertisement covers some eight hundred acres on the Smith River drainage basin in the Siuslaw National Forest, which is estimated to yield twenty thousand pounds of dry cascara-bark. The minimum price named is three cents per pound, which has been the prevailing price for

cascara-bark stumpage on the National Forest during the high prices of the last year. Many sales of cascara-bark, aggregating thousands of pounds, are made every year on the Siuslaw, but most of the sales are for small amounts. Peeling of cascara-bark is ordinarily distinctly a home industry, done by the settler with perhaps the help of some member of his family.

THE USES OF WOOD

WOODEN BOATS AND THEIR MANUFACTURE

BY HU MAXWELL

Editor's Note:—This is the twelfth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

STATISTICS of the woods used in the building of ships and boats, as they are referred to in this article, belong to the period immediately preceding the beginning of the war. No similar figures have been published covering the time since the war began. Pine, fir, and oak supply most of the woods consumed in the ship industry: pine 80,000,000 feet a year; fir, 44,000,000, and oak, 32,000,000. These are round numbers and some of them should be given more in detail. The principal pines used by the makers of ships are the following:

Southern yellow pine, 65,-698,652; white pine, 14,256,006; western yellow pine, 518,500; sugar pine, 200,500; total pine, 80,-673,658.

Three or more southern yellow pines contribute to the total, notably, longleaf, shortleaf, and loblolly. Northern white pine and Idaho white pine are listed without distinction. Western yellow pine is a single species, and that is also true of sugar pine. Forty per cent of all the wood used by American boat builders is pine. Twenty per

cent of all is fir. A dozen species of fir are native of the United States, but nearly all that goes into boat building is Douglas fir.

Other softwoods play a rather small part in shipbuilding, though some of them are quite valuable for particular purposes. The following table gives the annual consumption of softwoods:

Pine, 80,673,658; fir, 44,342,080; spruce, 7,783,980;

cedar, 6,999,722; cypress, 5,014,775; hemlock, 4,745,775; redwood, 837,500; larch, 328,525; total, 150,728,011.

No foreign softwoods have been reported in our shipbuilding though several imported hardwoods are listed, as is shown in the following table of foreign hardwoods:

Mahogany, 1,190,192; teak, 764,309; eucalyptus, 273,050; Spanish cedar, 27,300; Circassian walnut, 25,000; balsa, 20,000; lignum vitae, 10,000; padouk, 8,375; runkus, 500; cocobola, 200; total, 2,319,557.

Most of the foreign wood is worked into finish and specialties for large and small boats. Teak is



A CATBOAT UNDER SAIL.

The man who understands the manipulation of a catboat possesses the key to a world of enjoyment which is unknown to the uninitiated; but the novice may be brought to realize the meaning of the proverb: "Hard to manage as a catboat in a squall." The picture is shown by courtesy of Daniel Crosby & Son, Oysterville, Massachusetts.

deck wood, mahogany, Circassian walnut, Spanish cedar, and padouk, go into finish, eucalyptus is made into tree-nails, balsa into life preservers, and lignum vitae is choice material for bearings or gudgeons.

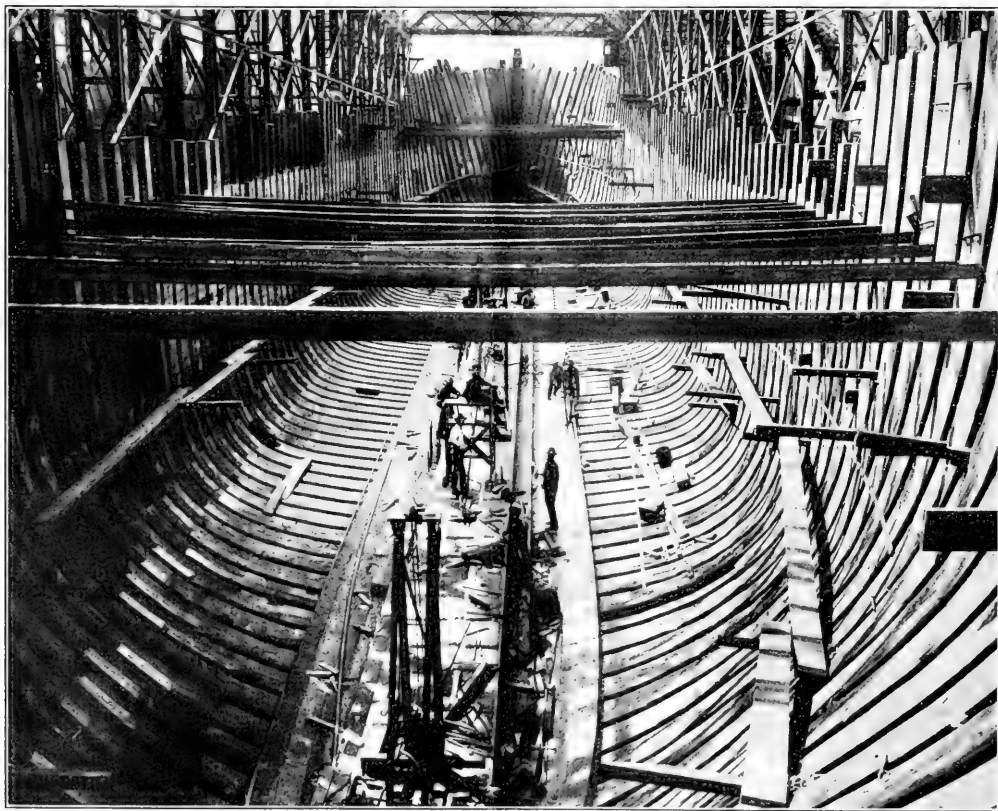
Domestic hardwoods contribute more than 46,000,000 feet a year to the boat-building industry, the separate contributions being shown in the list below:

Oak, 32,382,311; ash, 7,985,554; birch, 1,055,167; maple, 1,014,167; basswood, 959,000; chestnut, 751,295; elm, 706,600; yellow poplar, 448,077; beech, 219,366; locust, 215,028; cherry, 184,076; red gum, 164,000;

sycamore, black walnut, and apple; the tough are elm, hickory, cottonwood, and willow.

It would be interesting to know what changes the war has brought in kinds and quantity of woods demanded by ship yards; but that information is not yet obtainable and probably will not be for two or three years after the close of the war.

It was customary in England after the Revolutionary war had separated this country from that, to speak of American vessels as "fir ships." That was the custom especially when war ships were under discussion. It



HIGHEST GRADE SHIP TIMBERS

Douglas fir met the emergency when the call came for ships in a hurry to send our army across the sea. This is a fir ship under construction, and the builders were never held up an hour on account of shortage of timber. It came faster than the carpenters could use it. The photograph was furnished for this cut by the West Coast Lumbermen's Association.

tupelo, 138,490; hickory, 110,195; butternut, 78,237; California laurel, 47,500; sycamore, 38,000; cottonwood, 14,026; black walnut, 3,750; apple, 1,500; willow, 1,000; wild china, 1,000; total, 46,519,239.

Some of these woods have special uses, but it may be said of them generally that they fill places where strength, hardness, or beauty is required. The strong and hard woods in the list are oak, ash, birch, beech, locust, and hickory; the beautiful in grain or color are oak, ash, birch, chestnut, cherry, gum, butternut, California laurel,

was not done in a spirit of praise, and yet it was not ridicule. They used the word fir as a general name for all American softwoods—pine in particular. American ships then were largely pine, either southern yellow pine from Georgia or the Carolinas, or white pine from New York or New England. Pine prevailed in shipbuilding then and it prevails yet; but changes have occurred in sources of supply during a century or more. Formerly nearly all the timber was cut near the Atlantic coast; but now thirty-one states build boats, as may be seen by the



A LARCH IN NORTHERN
MICHIGAN

The larch or tamarack furnishes roots of peculiar value in boat building. The large, sharply-bent taproot makes a knee to brace ship frames. The long, fibrous roots supplied the thread with which the Indians sewed together the pieces of bark in making their canoes. The larch sheds its leaves in winter, hence its nakedness in the picture.

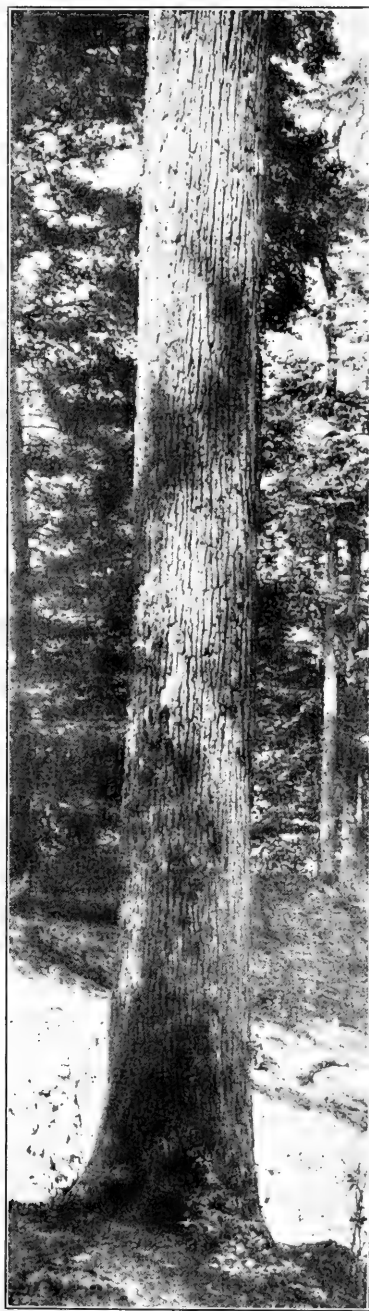
following table which gives the annual demand by states for shipbuilding woods, the figures representing feet:

New York, 37,700,500; Pennsylvania, 26,716,000; California, 20,617,010; Oregon, 14,900,400; New Jersey, 13,341,796; Virginia, 11,138,497; Maine, 10,299,400; Delaware, 7,867,136; Connecticut, 7,084,354; Maryland, 6,350,700; Washington, 5,876,560; Massachusetts, 4,607,864; Louisiana, 4,589,300; Michigan, 4,480,200; Ohio, 3,322,660; Wisconsin, 2,669,000; Tennessee, 1,775,000; Florida, 1,615,000; West Virginia, 1,614,000; Indiana, 1,462,000; Arkansas, 1,210,000; Illinois, 1,020,000; North Carolina, 800,000; South Carolina, 756,000; District of Columbia, 535,000; Alabama, 511,000; Missouri, 431,000; Rhode Island, 414,000; Minnesota, 107,000; Idaho, 63,000.

The wood with which to build boats is doubtless procured in the forests of more than thirty-one states, but the reports do not show the origin of the timber which shipbuilders use, though it is well known that every forested region furnishes some of it.

The ship industry gives a better line on trade, from the historical view, than any other industry gives. Most commodities are intended to be sold in the markets of this and foreign countries; but ships are designed, not to be themselves sold, but to carry other products to market, and ships have never been built unless the builders were reasonably certain of cargoes. During early years American-built vessels carried cargoes to and from our shores, and while that condition existed, our shipbuilding was a pretty fair index to our sea borne trade.

But gradually foreign vessels captured our ocean-borne traffic and our vessels almost dis-



A SPLENDID CANOE TREE

The yellow or tulip poplar was formerly known as the canoe poplar because it was the best in the eastern states for dugout canoes, hewed from its faultless trunk. Such trees are now sawed into house finish and stock for making vehicle bodies. It is the largest hardwood tree of the United States.

appeared from the seas. A discussion of the causes of that unfortunate state of affairs does not fall within the scope of this article. The early builders of ships and boats in America brought the art with them when they crossed the sea. Among them were men who were masters of the business. They belonged to the foremost seafaring people of that period; and when they landed on the eastern coast of the New World their practiced eyes quickly surveyed the unbroken forests and saw an abundance of ship material ready for cutting. They had scarcely set foot on the shore before some of them began to build ships, and their descendants have been building ships ever since. They received occasional hints from the native Americans, but no serious lessons, for the Indians were poor seafarers. Some of them ventured in their light boats a few miles from shore to fish, fight, or hunt, but their chief activities afloat were confined to rivers, lakes, and other inland waters. The Indians' boats were built for

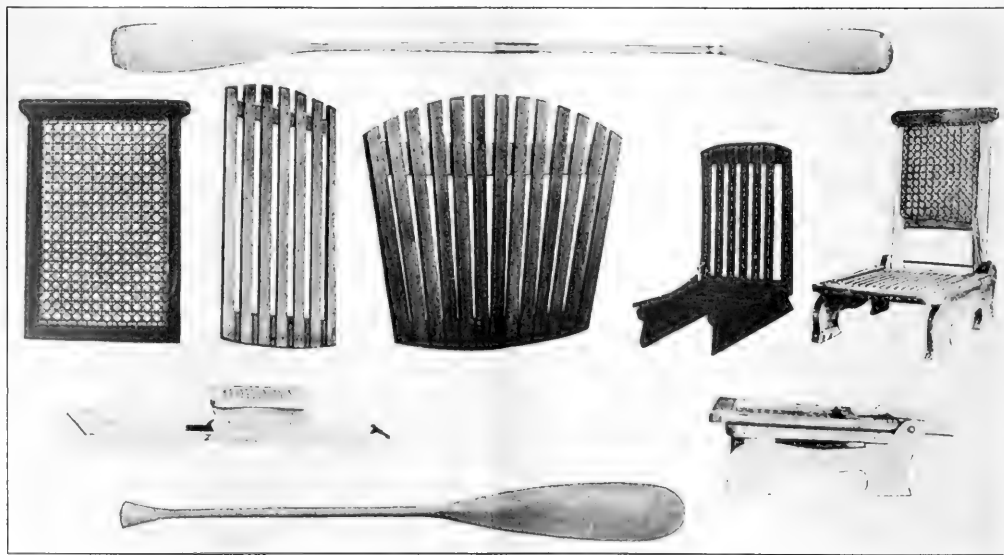
smooth waters, for the most part, and along that particular line they were able to teach the newcomers, and they did so. Nevertheless, not much that was new in making boats or in sailing them was found in America. Nearly all that the aborigines knew had been known hundreds or thousands of years before by people of the Old World. The Indian's canoe was the most interesting of his inventions or discoveries as a means of water travel, and he had two kinds of canoes, one of bark, and one of wood. It is not necessary to deal with these at length, but it is proper to speak of them, because canoes modeled after those of the Indians preformed a very important part in our early history, and these canoes are with us yet, though in modified form. They are used now for pleasure more than for business.

The bark canoe was most in use on northern waters, and it was generally made of the bark of paper birch, though some were made of the bark of elm, basswood, hickory, and of other trees. The



THE IDEAL BARK CANOE

Canoes like that in the picture may be seen in dreams and heard of in romance, but such things in real life are not much in evidence. Let no one look for a canoe, which is little longer than a man, carrying two persons while floating high and graceful as a white swan. They are met with only on the pages of summer resort folders.



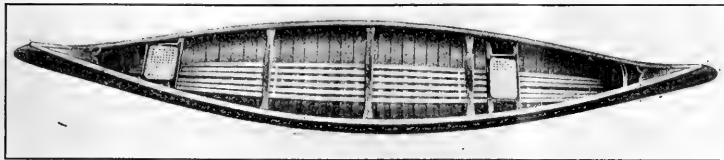
ADJUNCTS OF PLEASURE BOATS

These articles consist of a single and a double paddle, three styles of back rests and two folding canoe chairs, and adjustable rowing seats. Such articles belong in the industry which makes boats and supplies, and they are produced in very great quantities.

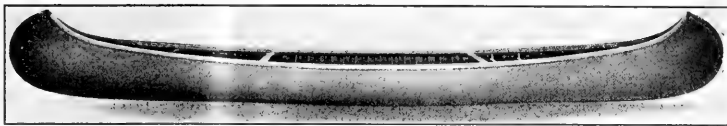
pieces of bark were sewed together with strips of hickory, basswood, or wicopy bark, or with the fibrous roots of tamarack; and the seams were made watertight with pine and balsam resin, or with the pulpy inner bark of slippery elm. Such canoes varied in size from the shallow coracle four feet long, thirty inches wide, and six inches

their spouts with wood, thus killing the monsters. It is apparent that the flimsy vessel has played its part in history and romance. The bark canoe long ago disappeared except as a plaything to induce tourists to part with their dimes at resorts. It is believed that no factory makes bark canoes, though a few are still made by individuals.

The dugout is a canoe hollowed from the trunk of a tree, and in the past this boat varied in size from little troughs barely large enough to carry one man, up to enormous hollowed trees which might carry fifty men and their equipment. The Jesuit



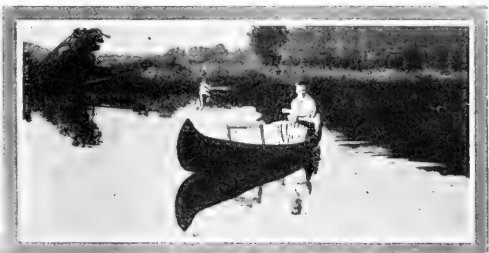
deep, up to the trading vessel thirty feet long, thirty inches deep, and four and a half feet wide. When offered for sale, the largest bark canoes were held at about forty dollars. They were very important in trade, travel, and war. Alexander Mackenzie took one of them from the region of the Great Lakes to the Bering Sea by way of the Mackenzie and the Yukon Rivers. That was perhaps the longest single journey ever made in a boat propelled by human power alone. Bark canoes sometimes carried sails, and Louis Hennepin is authority for the claim that they could cover a distance of 160 to 180 miles



BIRCH BARK CANOE-MODEL

The northern Indians reached such perfection in their birch bark canoes that the white man was never able to make any improvements in the model. The above cut gives two views, one sidewise, the other perpendicular, looking down into the canoe. No bark canoes are now on the market, though an occasional one is made for private use.

missionaries mentioned canoes a hundred or more feet long. The largest dugouts on record were made by Pacific Coast Indians of red cedar. Nearly any tree can be made into a dugout if the trunk is large enough, solid, and straight. White pine served well, yellow poplar was



in a day under sails made of bark. New England Indians with fleets of bark canoes engaged in battle on the ocean, according to Roger Williams; and a fleet of fifty bark canoes and one hundred and seventy dugouts was mobilized on the Allegheny River in 1753 by the French for the invasion of the Ohio Valley. Lawson in his account of the Carolinas states that the Indians of that region hunted whales by sailing after them in canoes, mounting on their backs, and plugging



IN A LIGHTER VEIN

Canoes built for pleasure hold their proper place in the ship and boat industry. Such canoes are met with by hundreds on lakes and rivers in the north country in summer. They are marvels of lightness, grace and beauty, and are constructed of the finest woods obtainable.

the favorite in the middle states, andypress in the South. The Indians hollowed their canoes chiefly with fires, using stones and shell as scrapers to finish the work. Other good canoe woods were

sycamore, black walnut, butternut, cucumber, sassafras, ash, cherry, and red and white cedar. The lighter cedar canoe was the ordinary means by which the early farmers of New Jersey and eastern Pennsylvania carried their produce to market, according to Peter Kalm who wrote



LIVE OAK FOR SHIP KNEES

This is a fair and fine specimen of the southern live oak of which the largest ship knees have been made. This particular tree stands within the corporate limits of New Orleans and it is known locally as the "dueling oak," leaving the imagination to conjure up whatever uncanny associations it will, to account for the ominous name.

about 1749. The dugout was the primitive ferryboat almost everywhere in the eastern region before bridges were built, and made travel on foot possible and assisted the development of the country. As with the bark canoe, the dugout is seeing its last days and has disappeared except in a few remote districts where a relic may occasionally be seen. A log of suitable size and form for an average dugout would saw from 500 to 1000 feet of lumber. Dugout canoes were common in Europe in very early times, as they doubtless were in all countries that had suitable timber.



THE BARK OF WHICH CANOES WERE MADE

Most Indian canoes in the North were of thin sheets of the bark of paper birch, stretched over frames of wood to hold it in shape. The above picture shows a sheet of this bark. The long lines in the bark are characteristic of this birch, though not peculiar to it. Similar markings may often be seen in cherry bark

The Indian canoe was valuable in its days. Formerly the settler or hunter went into the woods with ax, knife, and adze, and made his canoe. Today canoes, and all the light, small boats developed

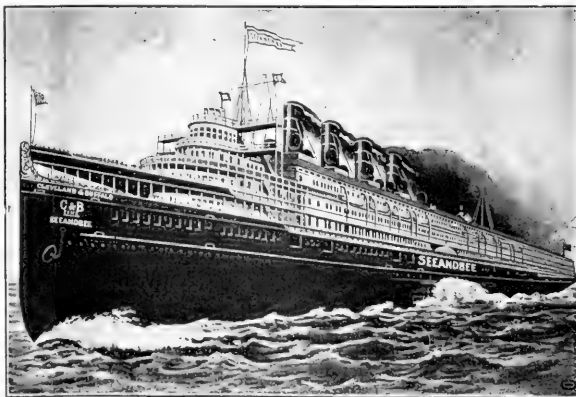
along the same lines, are factory made. The manufacturer selects his wood as carefully as ever the red hunter selected it, and he works it more skilfully and turns out a handsomer product. The light canoe which is now sold in sporting stores is modeled after the bark canoe more

than after the dugout, though both shapes are retained in modern production. The Indian and the white trapper made a frame of light sticks and slats, and over it they stretched the bark forming the skin of the vessel. The modern manufacturer makes a frame of slats also, but he makes the shell of his canoe of thin lumber in place of bark, or he may stretch waterproof canvas over a frame and make a collapsible boat. The modern canoe is a little more substantial than the Indian's handiwork, but what the modern canoe gains over its prototype in substantiability it loses in romance. "The forest life," "with its mystery and magic," of which Longfellow spoke in *Hia-watha*, is not in the factory canoe as it was in that made of cedar

slats, birch bark, and tamarack roots, by the wild hunters of the wilderness.

The bateau as formerly used in America was a flat-bottomed boat whose chief business consisted in carrying merchandise on the rivers and small lakes. The name was applied rather loosely to boats of several kinds and sizes; but one of the earliest patterns was made by sawing a dugout canoe down the middle from end to end, separating the halves four or five feet, still leaving them parallel, and nailing boards across to form a bottom. Bateaus made in that way carried large loads and sometimes ventured out to sea for long cruises up and down the coast. Fifty or sixty barrels of flour could be carried at a single load.

The bateau is not much spoken of by that name now, but it has been modified, developed, and enlarged until it



CALIFORNIA REDWOOD IN SHIPBUILDING

This splendid steamship is the *Seandabee* of the Cleveland and Buffalo Transit Company. It is said to be the largest side-wheel ship in the world. The staterooms, partitions, canvas-covered decks and some other parts are of redwood. The cut is here shown by courtesy of the California Redwood Association.

has become the canal boat and the river barge of the present time. It always was and still is a slow and sluggish traveler and a carrier of heavy burdens. By building on it a superstructure, it becomes a houseboat, and many a one has assumed the dignity of a moving human residence. Such boats played a leading part in the "westward movement." Emigrants and homeseekers who "went

west" four or five generations ago built or bought such boats on the banks of the Ohio, Mississippi, Tennessee, Monongahela, and other rivers, and floated with the currents; or poled or paddled; or pulled or pushed their boats against the currents, and in that way worked slowly and courageously toward the land of promise. Their boats were of wood, usually to the last peg and treenail; and with broad-axes, poleaxes, crosscut saws, whipsaws, augers, and adzes, the boats were built of oak, yellow poplar, black walnut, cypress, and pine, before sawmills and shipyards made their appearance beyond the frontiers.

The trade boats intended for upstream travel were usually known as keelboats, and they were very important

on western rivers in the period intervening between the canoe and the steamboat. Keelboats were propelled by men with poles, and were made of any convenient wood, but yellow poplar and black walnut predominated on the Ohio River.

Pittsburgh was a noted point for traffic boats in early times, as it still is. Eastern adventurers gathered there



ONCE WAS IMPORTANT IN BOAT BUILDING

This is a balsam fir. It is not now of any special importance in the boat business, but it was the source of the balsam with which the Indian canoe maker stopped the leaks in his frail vessels and made them serviceable. When Hiawatha made his canoe he "took the tears of balsam" and made it waterproof, as Longfellow tells the story.



SUPERFINE SHIP MATERIAL

Approximately a half a trillion feet of Douglas fir yet remain in the forests, according to the best estimates. No scarcity of ship material in the near future need be feared. Groups of trees like these in the above picture explain how it is possible for a single tree specie to produce such extraordinary amounts of timber. Photograph by the Kent Lumber Company, Seattle, Washington.

to "start west," and not only dozens, scores, and hundreds, but thousands of flat-bottomed boats were built in that vicinity to carry settlers to Kentucky, Ohio, Indiana, Illinois and Missouri. Today enormous barges assemble at Pittsburgh, as the pioneer boats assembled there a century or a century and a half ago, and move off down the river toward the west; but today they carry coal instead of emigrants. The same forests which furnished the planks for the bateaus of 1783, and the keelboats of a later time, still furnish planks for the coal-bearing river barges of 1918.

The wooden ships of commerce that sailed the seas during the early period of our history, and down to the present, have been made from relatively few woods, considering that our forests contain nearly six hundred species. The wood must be suitable and convenient. On the Atlantic coast white and yellow pine and white oak have been in most demand, but some elm has found place, as also a little hemlock, chestnut, beech, Norway pine, and yellow poplar. On the Pacific coast Douglas fir and Port Orford cedar were used in early ship-

building and are still so used. The construction of ocean-going merchant vessels on rivers far from the sea was an early industry. The upper Ohio, from the vicinity of Pittsburgh to Marietta, Ohio, was busy with shipbuilding before the opening of the nineteenth century. Ships built there, 2000 miles by the river highway from the

sea, were important carriers of American commerce. One of the ships when it reached Italy, was detained by the officials because the port of clearance was believed to be fictitious. They had never heard of Marietta. Ships built on the upper Ohio passed down the river at frequent intervals on their way to the sea, and carried cargoes to the West Indies, France, Italy, and to other foreign countries besides carrying coal, flour, glass, pork, and furniture to Philadelphia and other home ports. The first cargo of

coal from Pittsburgh to Philadelphia, 1794, by way of the Gulf of Mexico, sold at \$10.50 a ton at Philadelphia.

It is worth mentioning that the Pittsburgh and Marietta ships were made largely of black walnut, and the wood attracted attention among shipbuilders because of its durability and on account of its great strength in proportion to its weight. The furniture carried in sailing ships from Pittsburgh was largely black walnut, cherry, and yellow birch, and it found a good market in the Atlantic coast cities.

The United States entered upon its navy program at a time when it with which to fight the Mediterranean pirates, late in the eighteenth century and early in the nineteenth. Several vessels were constructed of southern pine and live oak. The first six ships contributed greatly to the early history and the romance of the United States. These ships were



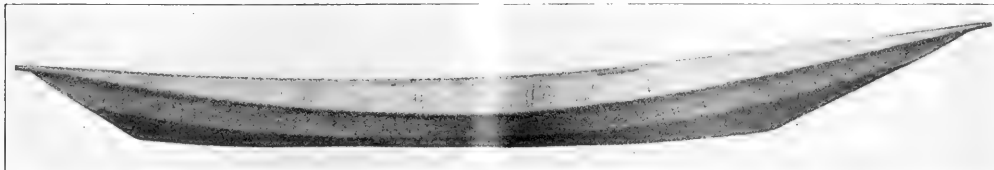
WESTERN CANOE CEDAR

This is the western red, or giant, cedar, and the picture is shown by courtesy of the Three Lakes Lumber Company. It was of this cedar that the Pacific Coast Indians made their remarkable canoes, some of which would carry nearly or quite a hundred men. The wood is soft and is easy to hew. Few dugouts are now made of it.

had become necessary to provide ships with which to fight the Mediterranean pirates, late in the eighteenth century and early in the nineteenth. Several vessels were constructed of southern pine and live oak. The first six ships contributed greatly to the early history and the romance of the United States. These ships were

the *Congress*, *Constitution*, *President*, *United States*, *Constellation*, and *Chesapeake*. They were built of yellow pine, live oak, and locust. The *Constitution* was the famous "Old Ironsides" and it was never defeated though it fought many battles. It is still afloat, though much patched. The *United States* fell into the hands of the Confederates early in the Civil War, and when it was

When these six ships were planned it was believed that war vessels could not properly be built in America without live oak timber. The strong knees, cut from roots, limbs, and trunks, were the best in the world, and the planking and frames were nearly indestructible. In order to make sure of a supply of this splendid timber for all time, the government entered upon a policy of buying

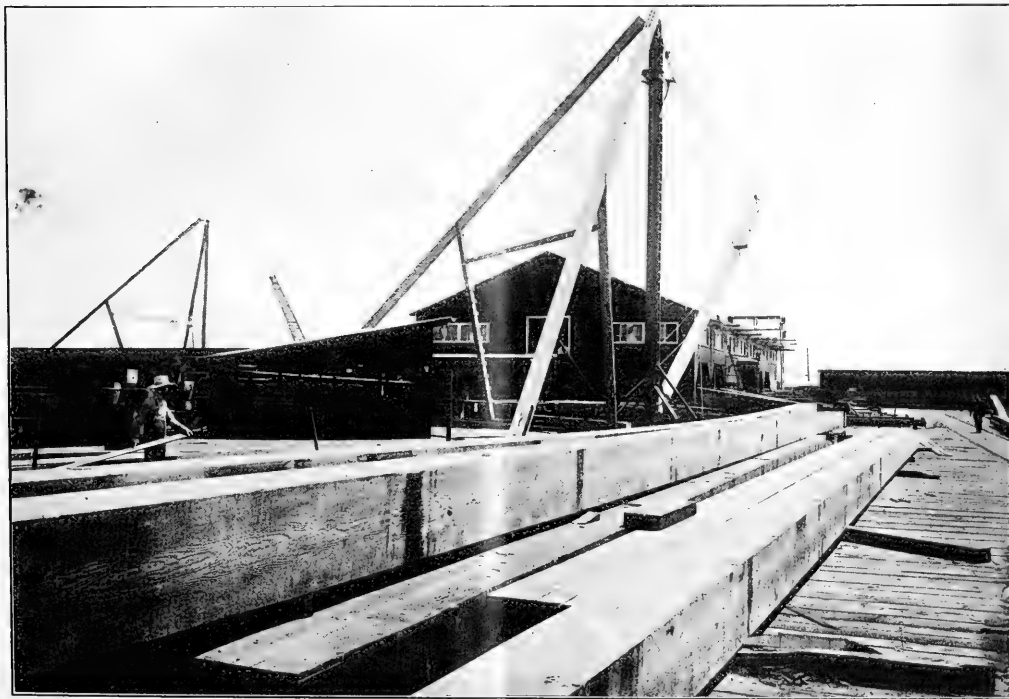


THE BATEAU STILL CARRIES TRADE

Bateaus, those serviceable boats of burden of the olden days, did not all disappear when the steamboat was invented. The accompanying cut represents a bateau advertised by its builder as being "for river and lake use," having "exceptional carrying capacity" and in great demand "among lumbermen, river drivers and contractors."

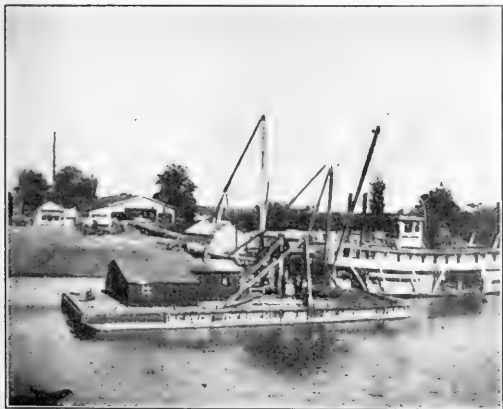
about to be recaptured, they sunk it in the Elizabeth River. It was raised, and it rounded out its 112 years of service. The *Chesapeake* was captured by the British in the War of 1812, but the commander's last command before his death in the fight has become a famous rallying cry, "Don't give up the ship." The shot-marked timbers were used in building a mill in England which was still in existence a few years ago.

live oak land and secured several tracts in Florida and Louisiana. That was really the beginning of the National Forest Service. It is worthy of note that the policy of buying land at that time was opposed, and prominent men urged the purchase of oak without the land. Their ideas of what would be needed were betrayed by the declaration of Benjamin Stoddart, a naval officer of that time (1799) that "\$100,000 will buy enough timber to



WITHOUT A RIVAL IN THE WORLD

Long, large and clear Douglas fir timbers like these were recently shipped by the trainload across the continent to eastern shipyards where a shortage of such stock threatened to tie up building operations and delay the completion of transports to carry American troops to Europe. Supplies were ample and the transports were completed in time, as is now a well-known fact.



SCOWS AND BARGES

Boats may be useful without being pleasing in appearance. Scows, dredges, barges and others that are designed to work in unromantic situations, are as necessary as are any others. They are generally built of heavy and durable planks and timbers to provide the strength which they must have to assure long service.

supply the navy for ages." Small prophetic vision had he of the mighty demands that would be made upon our forests to provide ships for our war with Germany in 1917 and 1918. All the timber needed for our first navy would scarcely supply one of our shipyards one month at this time.

The policy of buying and protecting forest lands fell into disuse when iron ships seemed to be about to do away with wooden vessels. The promise was not fulfilled, as the present war has emphasized. The oak land acquired as a ship timber reserve nearly all passed out of the government's ownership in the years following the advent of the iron ship; but a little of it remains in Florida and is included in the National Forest there.

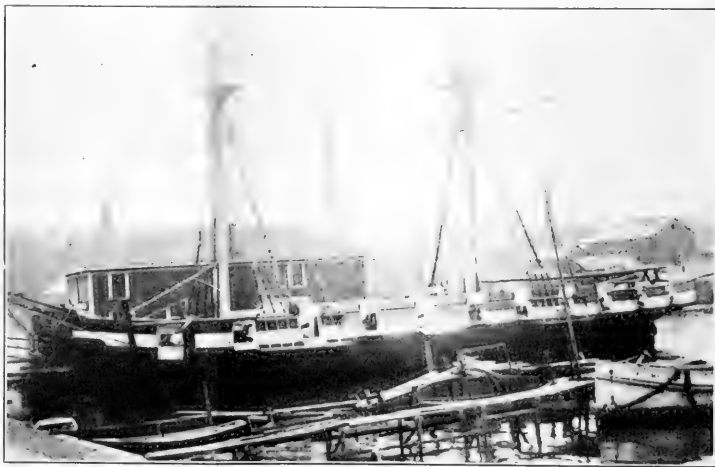
The "knee" is an essential in building the wooden ship. It is shaped like a crude capital L, and the bend suggest the name knee. It is a brace inserted in the angle where two timbers join in the framing near the bottom of the vessel. The braces are hewed or sawed from trees, a section of the trunk and the attached limb or root constituting the knee. Sizes vary. Large ships require huge and strong knees; other vessels take those of smaller size, while very small knees are sometimes used in boats which are little larger than big skiffs.

Many kinds of trees produce growths suitable for knees, but all do not. The wood must be strong and durable. The largest and strongest knees are those

hewed from southern live oak. Douglas fir is a valuable knee wood, and for small and medium-sized vessels much use is made of tamarack roots. This is the same tree that furnished roots as threads with which Indians sewed patches on their bark canoes. When the tamarack tree grows in the soil which it seems to like best, that is, a filled swamp with a soft soil a couple of feet deep above and a stratum of hard clay below, its roots take on a peculiar form. The root strikes straight down through the soft soil to the clay, and not being able to penetrate that, the root turns at right angles and follows the surface of the clay, thus forming the crook which becomes the knee.

All wood used by shipbuilders does not consist of heavy timbers. Doors, window frames, and inside finish of many kinds must be provided, much as is done in land buildings; and the kinds of wood used are not much different from those on shore. The iron ship needs wood finish in amounts depending upon the kind and size of the ship.

Our forests provide few woods suitable for the large pins with which ship timbers are fastened together. The pins are known as treenails and they vary in length from one to four feet and in diameter from a little less to a little more than an inch. Very hard and strong wood is demanded and it must possess small tendency to shrink and swell. Oak does fairly well if carefully selected and prepared, and a little red eucalyptus from California has been used on the Pacific coast, but the best is black locust. This tree's native range lies along the middle Appalachian Mountains and in the adjoining region east and west, though locust has been planted and it grows in nearly all parts of the United States. The manufacture of locust treenails by farmers and lumbermen was a paying business, on a small scale, until iron ships largely displaced wood. When we began building wooden ships to fight



COMMODORE PERRY'S FLAGSHIP NIAGARA

This relic of the war of 1812 was sunk in the Battle of Lake Erie in which the Americans won a signal victory over the British. The vessel was recently raised and is now one of the show objects at Erie, Pennsylvania. It was built of green timber cut on the lake shore and is in a good state of preservation.

Germany in 1917, the locust treenail came into larger use than ever in the past.

In building the war vessels constituting the first American navy, much locust was used for stanchions, braces and posts, the wood being so extraordinarily strong that small pieces were sufficient. In the War of 1812 American ships won victories in rapid succession over British

vessels of equal or larger sizes, and an English naval writer gave it as his opinion that the superiority of the American gunnery was due to the locust wood in the ships. Small stanchions and braces took up less of the precious space and gave the gunners more elbow room in serving their guns, and it may have had something to do with the marksmanship that won victories.

FOREST OPPORTUNITY* ON PINE LANDS IN THE SOUTH

BY F. W. BESLEY

STATE FORESTER OF MARYLAND

THE South is the land of opportunity. A favorable climate, abundant rainfall, suitable soils, and a long growing season make it admirably adapted for growing crops. About fifty per cent of the land area is in forest, which points to the growing of timber as one of the most important crops of the South. Yet, with all these natural advantages, there is a vast area of idle land, and this area is increasing rather than diminishing. In these days, when increased crop production is demanded, it is of the greatest importance to devote all lands to their most productive use.

The three important uses of the land of the South are for agriculture, for forestry and for grazing, and the sooner a classification of land is made on this basis, the better it will be for all concerned. The area in farm crops is certain to increase and much cut-over land, now classed as forest but in an unproductive state, will come under the plow. There is, however, only a small percentage of this forest land that will be needed for many years to come, and the great bulk of it will probably remain in forest indefinitely.

The present uncertainty of future use injects an element of chance and speculation into the problem that seriously interferes with a permanent solution. In the mean time, awaiting a permanent classification of the land, it would be possible to grow another crop of timber on most of it to the great advantage of the country, and certainly without detriment to the land.

It is unfortunately true that no great amount of interest in growing timber can be secured in a section where there remains any considerable amount of the original forest. The statement was made by the Secretary of the Southern Pine Association at a meeting of Foresters in Jacksonville in January, 1919, that the large Southern pine operators at the present rate of cutting expected to be "cut out" in ten years. This may be reasonably assumed as practically ending the supply of virgin growth pine timber. After that the timber supply of the South will be dependent to a very large measure at least upon the second growth.

While the rapid disappearance of the original pine forests of the South, which have been the chief source of wealth, is somewhat appalling, it is not altogether an unmitigated evil. The business of exploitation by those who see no future value in the lands will eventually be succeeded on a large part of the pine area by the

business of timber growing on a basis of sustained yield.

There is no other part of the country that is better adapted for timber growing than the South. The most favorable conditions exist. Cheap lands, the best native species, rapid growth, combined with excellent transportation facilities and the possibility of developing important local wood-using industries, render conditions almost ideal.

The day of cheap timber is rapidly disappearing, just as rapidly as the disappearance of the original growth. The price of timber will be measured by the cost of growing it plus a reasonable profit. We are now passing through the transition stage from unrestricted timber exploitation, with a disregard for the future, to timber growing on a permanent basis, with a certainty of adequate returns on the investment.

There will be much changing in the ownership of land, and it will take many years to effect the readjustment, but it is certain to come, and with it a feeling of security of investment and enterprise that has never existed before.

The forests of the South have been the chief source of timber supply for more than two-thirds of the population of the United States for many years. The exhaustion of the original forests is not only going to remove a chief source of wealth to the South, but is going to have a far-reaching effect in the country at large.

A large part of the pine lands were acquired, and are still held, by lumber companies, whose chief concern has been, and still is, to cut and sell the timber and afterwards sell the land. After the timber is cut off, the land has little, if any, sale value, and consequently most of it is still held by the lumber company owners.

Under private ownership, the cut-over lands have been practically non-productive, partly because the owners could see no profit in a second crop, and partly because of the impossibility of protecting these lands against fires, so that reproduction could be secured. Little can be hoped for through private ownership under present conditions, and it is not likely that much can be expected from private initiative for many years to come.

It is manifestly the duty of the State to lead the way and to place timber growing in the South upon a permanent basis. Every State in the South should have a Forestry Department, organized for administrative and scientific work. Several of the States have already taken

this step. Each State should acquire and place under the management of its Forestry Department large areas of forest land, upon which to demonstrate the principles of applied forestry. Cut-over pine lands can be acquired at low cost, and, under the favorable conditions existing in the South, it should be possible to clearly and convincingly demonstrate the practicability of handling them for profitable timber production. This program will give to the State a definite problem to solve and a definite forest policy to follow. It would give the Forestry Department a stability and a permanency that does not now exist, and would enable the State to demonstrate the best methods of handling forest lands for timber production. Forest fires, which are today preventing forest

growth, must be brought under control. It has been demonstrated that fire in specific cases is an aid to reproduction, but it must be absolutely under control and used at the right time by those who know how to use it to aid the forest, and not left to the cattle raisers to scatter promiscuously for the destruction of the forest. The solution of the fire problem is, in a large measure, the key to the whole situation, and is one that must be worked out through much trial and tribulation. It is on large areas of State-owned land, where fire protection can be practiced without interference on a large scale, that the fire problem can best be worked out in a convincing way. Until that is done and public sentiment reconstructed timber growing as a business will not make progress.

WASHINGTON'S FIRST MEMORIAL TREE

THE first memorial tree planted in the Nation's Capital was in honor of the men from the United States Department of Agriculture, who gave their lives for their country. It was a white oak set out on the spacious department grounds, with Secretary Houston and Mr. Henry S. Graves, Chief Forester, both of whom

"gave up their lives in the great war. We will not forget the part they played in that struggle, nor their sacrifice. We shall pay tribute to their memory in divers ways.

"Today we are planting a tree for them. Nature will build from it a living monument. Every year it will



Photograph by Harris and Ewing

PLANTING WASHINGTON'S FIRST MEMORIAL TREE

are vice-presidents of the American Forestry Association, as chief participants in the simple ceremony. The various bureau chiefs and other officials of the department were present at the planting.

"Many members of our department," said Mr. Graves,

strike its roots deeper, raise its crown higher and spread its branches wider. It will grow in stature and strength, like our own appreciation of the devotion of the boys who gave all that their country and the world might be a better and happier place to live in."

FORWARD WITH TREE PLANTING

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

*"He who plants a tree,
He plants love.
Tents of coolness spreading out above
Wayfarers he may not live to see.*

*Gifts that grow are best;
Hands that bless are blest.
Plant! Life does the rest."
(From poem "Plant a Tree,"
by Lucy Larcom.)*

IF YOU or your city have not joined the army of those who are planting trees, enlist now! With the growing interest in this movement, do not allow yourself or your community to lag behind. It is one of the most important pieces of reconstruction work in the United States in which you should have a part; in fact, it is a work which should be continuous and grow with the passing.

There is no reason why this should not be so. The interest which has been aroused in tree planting throughout the country should be maintained. The added impetus which has been given to this worthy enterprise by the suggestion of the American Forestry Association that trees be planted in honor of America's soldiers and sailors, both as memorials to the dead and as tokens of appreciation to the living for their offer of service, should not be allowed to die. It should be but the beginning of a great forward-sweeping desire and determination on the part of the people of America to see their cities and parks beautified with handsome trees, their roads and avenues shaded and strengthened and their forest resources enriched through a deepening and broadening of conservation methods and efforts. A patriotic chord was struck by the memorial tree-planting idea. It made an appeal which has been nation-wide; and in hundreds of places throughout the United States it has been carried into effect or plans are being made for its adoption either as a separate proposition or in connection with some other memorial being erected.

One of the big plans which has been suggested and which would fit in closely with that of the American Forestry Association, is that advanced by Col. Webb C.

Hayes, the son of a former president of the United States. Colonel Hayes was chairman of the Cuba-China Battlefield Commission of the War Department which was charged with the marking of graves of American soldiers who died in foreign service, and who has recently returned from France where he served as regional Commissioner for military labor.

This would provide for a county unit system of placing memorial tablets to the men who gave their lives

for their country. These tablets would be placed on the county courthouse or on memorial highways extending from county to county, preferably at the points where these roads enter adjoining counties. Then the plan for setting memorial trees along these roads would be pushed. This would lead to the building or improvement of thousands of miles of roads in the United States and to the planting of many miles of fine trees, which would be an inspiration to other effort in this direction at the same time that it was serving as a daily reminder to the people of America of the blessings of democracy for which their sons and brothers had fought and died. Colonel Hayes believes also that the idea could be extended to France with a memorial highway marked by trees extending

from Paris to a number of the battlefields where America's sons won undying honor.

Before leaving Europe Colonel Hayes cabled to the Chamber of Commerce at Fremont, Ohio, his home town offering to provide the tablets for the men from Sandusky County; and William G. Sharp, former American Ambassador to France, did the same thing for Lorain County. During the past session of Congress a bill was introduced by Representative Sherwood, of Ohio,



A MOST ORNAMENTAL TREE

The cone-shaped cypress with its graceful, light-green foliage is considered one of the finest trees that can be planted for decorative purposes, and is widely used throughout the United States.

although unfortunately it was killed in the rush of other business, which provided for the appointment of a commission to bring out the ideas of Colonel Hayes.

Large cities and small towns all over the United States are showing their approval of the memorial tree idea by putting it into practice. The story of what some of them

are doing is an inspiration to others. Almost since the day of the signing of the armistice the question of memorials has been a subject of public discussion in nearly every city and town throughout the country. It was recognized at once that every place would desire to honor in some permanent manner the service rendered by those who had died or had offered their lives for their country. In this discussion there was one insistent note, heard time and time again. This was that the memorial should be worthy. There was frequent expression of the opinion that there should be no repetition of some of the "atrocities" which had been erected in "honor" of heroes of former wars.

The spirit which was back of these, it was acknowledged, had been patriotic and worthy of highest praise; but the outward expressions in many instances, it was declared, had been anything but ornamental and had therefore been the subject of frequent criticism. Of tree plant-

ing editors and others throughout the country have had nothing but words of praise. It is most gratifying that this should be so.

In a letter which Vice-President Marshall has written to the people of Collamer, Indiana, in his own home county, the story of whose tree planting appeared in last

month's issue of AMERICAN FORESTRY, there is well epitomized the sentiment which has been stated in other words by hundreds of other people. The Vice-President said in part:

"The idea appeals to me far more than storied urn or animated bust. It embodies a living thing, representative of a vital sentiment of the American people and I hope it is going to be universally popular in America."

One of the most active of the larger cities of the United States in the memorial tree campaign is Philadelphia, already noted for its spacious Fairmount Park with many acres of beautiful trees and for a comparatively large number of trees which it now enjoys along many of its



A FINE OLD SUGAR MAPLE

This is one of the most popular trees for planting. For city streets the Norway maple is to be preferred to the sugar variety, except on wide streets with parking. The noble specimen here shown stands in Howard County, Maryland.

streets and in its suburbs. There the committee on municipal art and tree planting of the Civic Club and the Society of Little Gardens, are leading in the movement to plant what they call "Tribute Trees." They will work in co-operation with the Fairmount Park Com-

mission which has charge of all tree planting in Philadelphia. Individuals who do not care to plant a tree of their own are invited to join with some community group in placing such memorial. The United States Marines were among the first to ask permission to participate in this patriotic undertaking; and they desire to plant a whole avenue of trees. The members of the Civic Club

Charles W. Henry, Mrs. Edward Stotesbury Lewis, Mrs. J. Howard Rhoads, Mrs. John Frederick Lewis, Mrs. W. Beaumont Whitney and Mrs. F. A. Rakestraw.

In a recent communication, published in a local paper, John R. Johnson, superintendent of parks, Passaic, New Jersey, said: "We are too apt to look upon trees in a more or less matter-of-fact way, as something Providence



A FITTING MEMORIAL TO STRONG DEEDS. FOR IT IS THE "SYMBOL OF STRENGTH"

Mention of the word oak brings to mind the thought of long life and endurance. As a family the oaks are undoubtedly among the best of shade trees, for they are beautiful, long lived and little subject to disease or insects. This monarch white oak is in central Maryland.

committee which is interested in the movement are Mrs. Howard W. Lewis, chairman; Mrs. Henry Wolf Bikle, secretary; Mrs. Edward W. Biddle, Mrs. Leon T. Ashcraft, Miss Mary Blakiston, Miss Sophia Cadwalader, Mrs. Charles Davis Clark, Mrs. L. Webster Fox, Mrs. Rodman E. Griscom, Mrs. Roger W. Griswold, Mrs.

has fully provided for and of which there can be no end. It seldom occurs to our mind that the pleasure we received, and the comfort enjoyed from their presence, is in great measure attributed to the forethought and activities of generations long since passed away."

They are now erecting monuments in Ohio to "Apple-

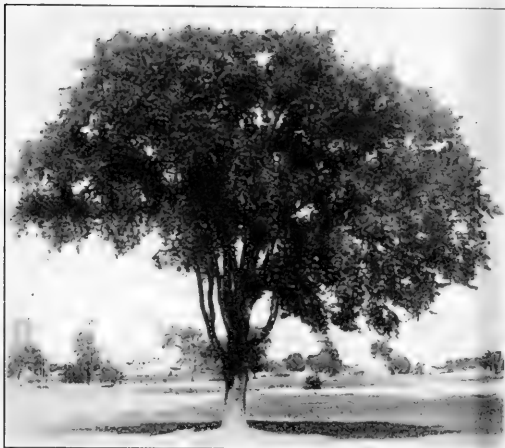
Seed Johnny" whose name is now a household word throughout the state because of the fact that this erratic knight errant of the road traveled hither and yon sowing the seed of tens of thousands of apple trees whose fruit he was never to enjoy but which have proved a great boon and a valued possession to others. That is the true spirit of the planter. He thinks of the future and of the enjoyment and blessing which will come to those yet unborn from the seed which he sows or the tree which he plants.

Similarly the future will rise to call those blessed who today are adorning our parks and avenues and the coun-

early in the year to investigate the amount of damage done and to ascertain what assistance might be given, reports on his return that about one and one-half million acres of forest land in France has either been destroyed by shell, machine gun and rifle fire or by the cutting by the contending armies for barrack, trench and fuel wood; that practically all of Belgium's forests having any timber value had been cut down by the Germans and used or shipped back to Germany; that fully 450,000 acres of Great Britain's forests had been felled.

The forest authorities of each of the countries named have declared eager to have the assistance of the American Forestry Association in providing them with American forest tree seeds. This help is to be extended and the work will be carried on this year and in 1920.

There are many ways in which the people of the United States can have the subject of tree planting kept before them. Those who have the subject at heart should help in various ways to keep this topic to the fore. At the present time there seems to be no better way, no method that will call forth a more popular response, than by making it a memorial to the soldiers. But then there



AMERICA'S MOST POPULAR TREE

It can be truly said that no other tree holds as high a place as the American or white elm. It is the most aristocratic of all the nation's shade trees; and is almost if not quite as beautiful a feature of the winter as of the summer landscape.

try's highways with handsome ornamental trees. Many of these will have a utilitarian value in and of themselves; but their greatest value from the economic point of view is likely to be the interest which they arouse in practical forestry, in conservation and in encouraging a more thorough and nation-wide study in the subject of timber resources. This is a matter which will become of greater and greater importance with the advance of our civilization and the increase of population not only in the United States but in other countries. The children will be taught the value of tree life because they will participate in the ceremonies incident to the plantings. They will know and come to appreciate more and more as they grow older the purpose for which this work was done. They will know it was because their fathers and their elder brothers were looking to the future welfare of mankind; and the lesson will impress its deep meaning on them.

The American Forestry Association is anxious to have its members interested not only in tree planting in this country but in the help which is to be extended to Great Britain, France and Belgium in restoring their badly cut or devastated forest areas. Percival Sheldon Ridsdale, Executive Secretary of the Association, who went abroad



A DESIRABLE SHADE TREE

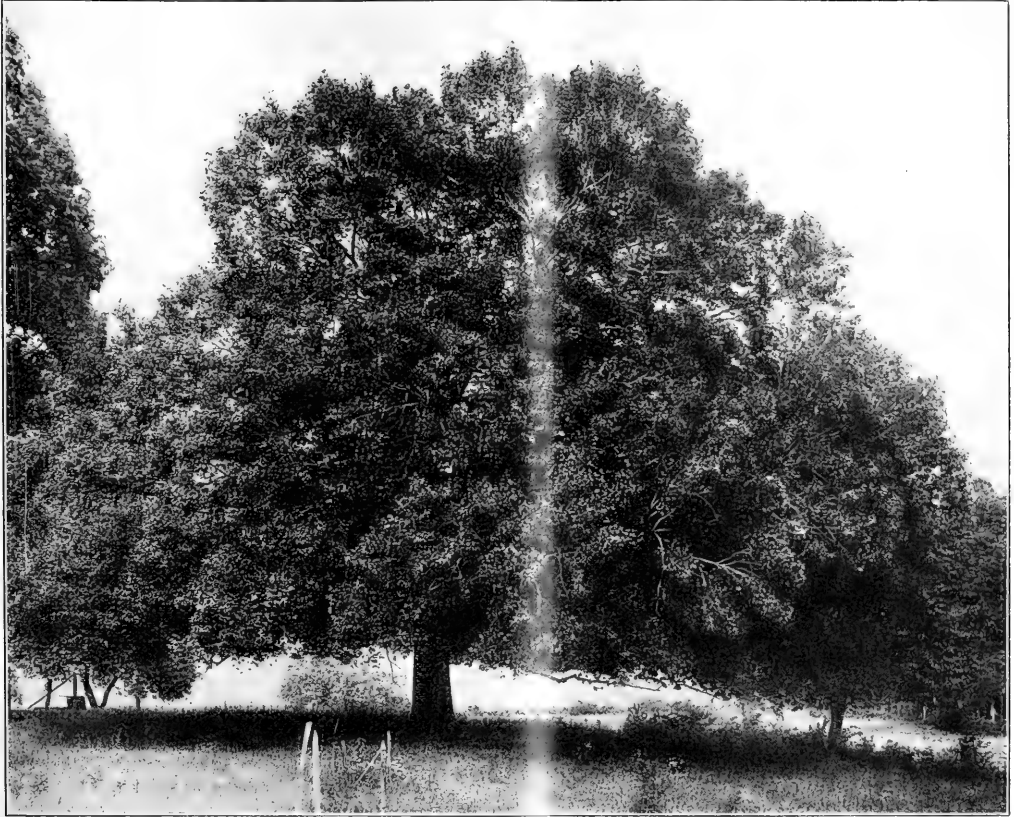
Under favorable conditions the white ash grows fairly rapidly and attains a good size with a moderately broad open crown and thin foliage. It is native to a wide territory throughout the United States.

are other persons and events that can be memorialized, and most fittingly, in this manner. The American Forestry Association has suggested that trees be planted in honor of the late Colonel Roosevelt along highway to be named for him and elsewhere; and this is being done in a number of instances. There are other lovers of nature, men who through their written or spoken words or in other ways have taught the beauty of woods and trees and flowers; and to all such trees might appropriately be planted. One such was Walt Whitman, the

centenary of whose birth will be celebrated on May 31 next. Many others will be found, some of national, others merely of local renown, who are worthy of tribute of this sort from their fellow-citizens.

In order to secure the best results it is necessary that there be as widespread interest as possible in the work. What a majority of the people in a community want done, or even a much smaller band of enthusiastic workers, usually is done. Is there a local forestry improvement association in your neighborhood? If so help to make its work successful by action. If there is no shade

a city street is somewhat at a disadvantage and so some care should be used in selecting the best variety for the particular locality and then they should be planted carefully and well cared for. Trees are beautiful or otherwise as they harmonize with their surroundings. Those that will look well on a narrow street may not be suited for a wider street or a broad avenue. If there is any doubt on the question it is advisable to consult the state forest commission, the local forester or some other authority who can tell what varieties are best for a given locality. Of course, no general rules could be given for the entire



THE LARGEST BEECH IN MONTGOMERY COUNTY

That is the boast which this tree can make. It is 10½ feet in circumference with a spread of 90 feet. It casts too heavy a shade for street planting, but makes a beautiful lawn tree. The one shown here is in Chevy Chase, Maryland, not far from the District of Columbia line.

tree commission, no city forester or other organization interested in this vitally important subject, interest yourself in the formation of such an association. In any community, whether it be large or small, there should be co-ordination of effort to secure the best results in shade tree planting and care.

In selecting trees for street planting the following qualities should be considered in about the order named: form, hardiness or adaptability, rapidity of growth, shade protection, neatness and beauty. At best a tree on

United States, or even for a major portion thereof; but in a larger part of the eastern United States it will be found that for narrow streets the red maple, red gum or ginkgo can be recommended for narrow streets; for wider streets, Norway maple, basswood, horse chestnut or pin oak; and for wide avenues, white elm, white oak, red oak and tulip poplar.

Street trees should have hardiness and adaptability. They should be vigorous, be able to recover from mechanical injuries and be as non-resistant as possible

against insect attack and disease. While quick growing trees are desirable in some ways it must be remembered that such varieties are likely to be the shortest lived and will have to be replaced sooner than those of a somewhat slower growth, which with good care can be made to develop more rapidly.

It is not desirable to have trees which cast too much shade, particularly on narrow streets. Houses and sidewalks need sun even in summer. Again the question of neatness ought to be considered; and trees which will break up the pavement, such as silver maples, or those which cover the pavement with their bloom in the spring, such being cottonwoods and poplars, ought to be avoided. Evergreens are not suitable for street planting because their shade is not wanted in winter. Black locust should not be planted because it is likely to be destroyed by the

than if brick or other loose-jointed material is used.

In planting a tree move as many of the roots as possible. A cloudy day is better for transplanting a tree than a bright sunny one because a bright sun quickly exhausts the stored up moisture. An important point is in regard to packing the earth around the roots. They should have close contact with the ground, because a tree feeds through its roots, and therefore every smallest rootlet should be firmly in the ground. To do this fill in around the roots with finely pulverized earth, working it under and around the roots by hand and compacting it. If the earth is wetted down as it is put in it will make a much better contact. It must be remembered that trees cannot take care of themselves. They need food and they need attention and so provision should be made for their nourishment and to see that they are properly pro-

THE VICE-PRESIDENT'S CHAMBER
WASHINGTON

February
Nineteen
1919

My dear Mr. Galbreath:

I am unable to say who was the author of the fine idea of planting trees in honor of the boys who answered their country's call for service in the war which we have waged against German autocracy. Whoever it was, in due season he will deserve a memorial at the hands of his countrymen.

The idea appeals to me far more than stories urn or animated bust. It embodies a living thing, representative of a vital sentiment of the American people and I hope it is going to be universally popular in America. When the trees shall grow large enough, a fitting

plate can be attached to each one of them, bearing the names of the soldiers.

Of course, it rejoices me greatly to know that the citizens of my county have, under your leadership, been among the first to take advantage of this idealistic and patriotic movement.

May Heaven send sunshine and showers upon these trees so that they may live to distant ages,—vital reminders to the youth of every generation of what America has done and great incentives to the doing of the fine things for which the Republic has been so remarkably conspicuous.

With sincere congratulations, I am,

Very truly yours,

John R. Marshall

Martin L. Galbreath,
Collamer, Ind.

borer worm. Beech is a slow grower and casts too dense a shade for any street.

There are several points to be taken into consideration. Trees planted along a street should be of the same kind, the same size and uniformly spaced. On narrow streets trees planted every forty feet apart, and alternated on opposite sides of the street, will be found sufficiently close; and on wider streets they should be from forty to sixty feet or even farther apart, the distance being determined partly by the size which the tree is likely to attain and other habits. Every tree should have at least six square feet of earth above its roots. It is more important that there be plenty of space where the pavement and roadway are paved with concrete

ected against insects and other pests and against damage from other causes.

Tree planting should form a permanent part of the improvement program in every city and town in the United States. It should not be undertaken in a temporary, haphazard manner; but should receive the constant thought and attention of those who are interested in making the community more attractive and at the same time in adding to the future timber resources of the United States. It must be remembered that what is done in one city or town serves as an inspiration to others; and that the habit once formed of setting out a number of trees every year will become fixed and will extend until it covers the nation.

WHY WOOD IS BEST

BY ALFRED GASKILL, STATE FORESTER OF NEW JERSEY

NO one thinks of building a battleship of stone, or a bridge of copper, or a cabin of steel. The qualities that determine the fitness of most structural materials are generally known; the inherent qualities of various woods, which make them valuable for specific purposes, rarely are recognized. Wood substance, or cellulose, is much the same in all kinds of wood, but a great diversity in the form and arrange-

(2) with reduction of the moisture content. The first requires a selection of the material more or less vigorous according to intended use; the second involves "seasoning," by storage or by artificial means, until the wood is "air dry." Fortunately it is now possible to know the real qualities of most of our commercial woods and to choose what is fit with only a guiding reference to old customs and preferences.



SPRUCE FENDER STOCK. OAK KEEL STOCK AT THE PHILADELPHIA NAVY YARD

ment of the elements produces a wide range of values. Practically every species has a characteristic structure, though it varies with the individual.

But though wood in general must be recognized as a material of great variability the constants in each species give positive advantages for many purposes. The truth of this depends upon the fact that fitness for service increases (1) with uniformity of structure and absence of defects (knots, cracks, crooked grain, etc.);

For engineers there have been constructed elaborate tables showing the resistances of all our principal woods to bending loads, compression, tension, shearing, indentation, etc.; the non-technical reader will be better satisfied with general statements.

The user of wood is apt to define its qualities by means of terms which mean quite definite things to him, but which really are relative, or are capable of various interpretations. For any important purpose it is advisable

to find the wood that furnishes the greatest total of desirable qualities *when air dry* as excess of moisture constitutes a defect. Quantity and availability often are decisive factors.

Strength is a term that is often loosely used to indicate the power of resistance to a strain without reference to other qualities, as weight, toughness, stiffness, etc. Thus hickory and white oak are strong to sustain a load, but in a beam may be less serviceable than longleaf pine or Douglas fir because the latter are stiffer. Pine on the other hand makes a poor hoe handle because it is comparatively brittle; oak is better but is apt to become bowed and is too heavy; ash is best because it combines sufficient strength with stiffness, flexibility and moderate weight. Another sort of strength is that which resists shock and "shear"—the qualities required in a hammer handle, an ax helve and a wheel spoke. For such use no wood known answers so well as young, quickly-grown hickory.

Durability as descriptive of wood quality is even more loosely used than "strength."

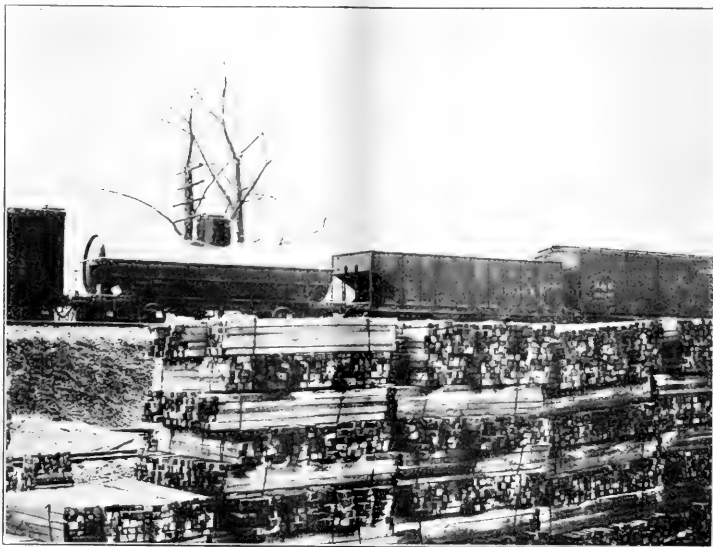
Most of those who deal with woods in a technical way understand it to be the quality which resists decay. When kept perfectly dry, or when entirely immersed,

any kind of wood lasts indefinitely, but if exposed to warm air and moisture it behaves quite differently. Poplar, beech, maple and most pines decay so quickly in contact with the ground that they are unfit for use as fenceposts, telegraph poles, railroad ties, etc.—they are not durable. Other kinds, as black locust, red cedar, black walnut, chestnut, will last for

many years under similar conditions.

For many purposes the greatest value is found when durability is combined with other qualities. Black locust or white oak makes a good railroad tie, for instance, because it is hard to resist the cut of the rail as well as durable to withstand decay; a bridge sill must be strong to carry a load, hard to endure wear, and durable to resist decay.

Within recent years durability has lost much of its practical importance through the development of processes by which non-



READY FOR SHIPMENT

Black locust squares $1\frac{1}{2} \times 1\frac{1}{2}$ in. by 12 in., 20 in., 24 in., 32 in., 36 in., 40 in., 46 in., long to be shipped for treenails. Keyser, West Virginia



SUGAR PINE SHAKES

This picture was taken in the Sequoia National Forest, California.

durable, or perishable, woods are made very durable. Thus by treatment with creosote, zinc chloride, etc., the hard but perishable beech and maples provide



THE STOCK DRYING ROOM

Showing oak and hickory spokes and elm hubs, at Oakland, California.

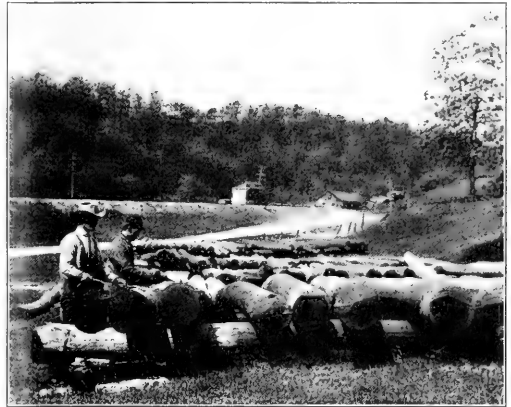
railroad ties of longer life than untreated white oak.

Toughness is the quality by which shocks and irregular strains are withstood. It is the opposite of brittleness and differs from strength and hardness. The classic example of toughness is a well-made wagon wheel. The hub of elm resists the strain of the spokes; the spokes of hickory carry the twists of traffic, and the mortised ends do not shear; the felloe of hickory or ash maintains its shape against every deforming

force. Hickory, white oak, white ash and rock elm are all tough woods. By combining toughness with elasticity and relatively light-weight white ash stands above all others for farm implement handles, for vehicle frames, and now for the structural parts of airplanes.

Brittleness is usually a negative quality; it may be positive when a fracture is short and produces no long splinters as tough wood when broken always does. It is one of the qualities that make black walnut the preferred wood for gun stocks.

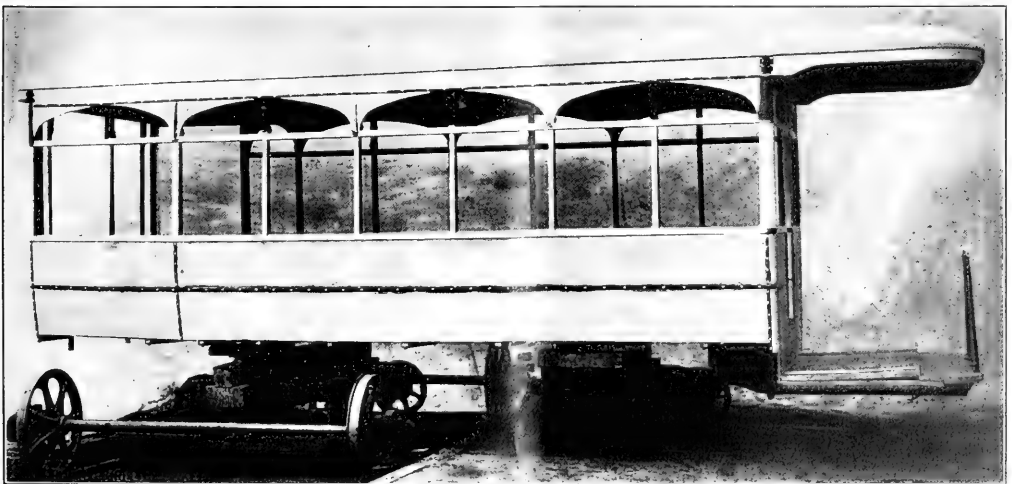
Elasticity is the property of recovering an original shape after deformation, and is usually a most valuable



PRESERVATIVE TREATMENT

Brush treatment of telephone poles, showing method of application.

quality. Oak makes a poor wagon tongue because it is only moderately elastic and is apt to bend and stay bent; but it makes a fine ship knee because it is hard and strong, as well as tough and flexible, and when



THIS IS THE BODY OF AN AUTOMOBILE BUS

White ash was used for the framework and interior finish.

bent under pressure will keep the shape given it. Elasticity is found in flexible woods like ash and hickory and in stiff woods like pine and spruce. A floor beam should be stiff and elastic; a carriage axle should be flexible and elastic.

Flexibility-Stiffness: As an archer's bow so must the felloe of a buggy wheel be flexible, elastic and tough. For the buggy wheel hickory answers best; for the bow ash is chosen because it is lighter and does not "set" so readily. No one would choose a flexible wood for a bridge stringer, or for a car sill, but one which is stiff, strong under a load, durable and not too heavy.

Hardness is of importance when the service required of a wood tends to cut into it, or to wear it down. A railroad tie must resist the cut of the rail; a floor board not covered with a carpet must withstand wear. A door of soft wood is better than one of hard wood because it is lighter and hardness gives it no advantage. The best flooring is "quarter sawed" to show "edge grain" because that face wears better than a common face sawed "through and through." In ordinary carpenter work hardness is a disadvantage as it increases the labor required with no corresponding gain.

Shrinking: The wood that shrinks, or works, least is always preferable. A carriage panel or a table top that shrinks after it is finished will show an unsightly crack unless provision is made to conceal the contraction. Floor boards are made narrow partly to expose the edge grain, but chiefly to neutralize shrinkage. If an eight-inch board shrinks a quarter inch there is an appreciable space between it and the next. If the eight inches are covered by four boards the gap between each is only one-sixteenth of an inch.

Woods differ in this quality according to their struc-

ture, and for particular purposes must be chosen with reference to it. But apart from that the moisture content is of great importance. In some species the green wood may contain as great a weight of water as of wood substance. In any species seasoning causes the water to be evaporated and the wood to contract. In general the coniferous, or soft, woods shrink less than the hard, deciduous, woods.

Weight: Our common woods vary from 22 pounds (white cedar) to 53 pounds (hickory) per cubic

foot — air dry. Where strong timbers are to be used near the point of production, weight can be ignored. When cost as well as quality must be considered the transportation of a heavy wood handicaps it. But in some cases weight is vital: airplane wings, for instance, are framed of selected spruce because that wood possesses considerable strength and stiffness combined with extreme light weight. Ash likewise is a preferred wood where strength, toughness, elasticity and a minimum weight must be combined.

Other qualities, as *density*, *tastelessness*, etc., are sometimes of importance. A tight barrel can be made of white oak, but not of red oak because the latter contains numerous open vessels or "pores." Containers and implements

made of wood that imparts no taste. Thus butter tubs and oyster pails are made of spruce, or ash, or maple.

No user of wood doubts that its manifold qualities are advantages rather than faults, since only through them can the forest product, wood, be made to satisfy so many human needs—needs that range from the coarse, solid endurance of a railroad tie, through the soft, weather-proof, roof shingle to the light, stiff and strong wing of the mechanical bird.



WOOD WHICH TWICE OUTLIVED STEEL

White oak tie, side view. This tie was laid in the track during the year 1888. The steel has been changed twice since that time. The ties have decayed but little and will probably serve in a side track for four or five years. Plains, Montana.

One of the members of the American Forestry Association desires to locate a tract of about one thousand acres in New York State, within 150 or 200 miles of Buffalo, for hunting, fishing and vacation purposes. Valuable timber is not essential—cut-over land preferred. Information will be gratefully received and promptly forwarded.—Editor.

MANDRAKES; WILD LUPINE, AND NOTES ON THE AMERICAN SNAPPING TURTLE

BY R. W. SHUFELDT, M. D., C. M. Z. S., ETC.

(PHOTOGRAPHS BY THE AUTHOR)

SO FAMILIAR are the May Apples to every one who lives in the country where they grow, that a detailed description of the plant is hardly called for in this place. Then, too, the illustrations of it as shown in the present article, at various stages of its growth, furnish all that may be necessary to refresh the memory

of those who fail to remember this most interesting representative of our eastern flora. It is generally called the Mandrake, or more rarely the Hog Apple, and still more rarely the Wild Lemon. Its generic name in botany is derived from two Greek words, meaning a foot and a leaf; and it is said that one of its earlier names (*Anapodophyllum*), bestowed upon it by Linnaeus, carried this idea still further, for it likened the leaf to the foot of a duck. Professor Gray, however, claims that it referred to the "stout petioles," which hardly seems likely. Although Mandrakes may, as a rare thing, come up singly in the woods where they oc-

cur—or perhaps only a few together—it is the rule for them to appear suddenly in more or less extensive patches, often covering a very considerable area. Their appearance is quite simultaneous, as is their flowering and, later, their fruiting, to which may also be added their death in the autumn. In the North, the plant is not seen

until along in May; while, as we advance southward in the spring, we often find them up in the month of April in the District of Columbia, and still further south very much earlier. It is an abundant species throughout the entire range of the Gulf States, to include large areas in Texas.

When the fruit of the Mandrake ripens in the summer, children are extremely fond of eating it, the slightly acid and sweetish taste especially attracting them. By them it is sometimes called the "Umbrella Plant," and for the reason that the leaves "unfurl" during April showers."

With respect to this Gray says that the "flowerless stems terminated by a



Fig. 1. WE HAVE IN THIS PICTURE A VERY BEAUTIFUL EARLY SPRING COMBINATION OF AN OLD JUDAS TREE (*Cercis canadensis*), WITH A PATCH OF MANDRAKES OR MAY APPLES (*Podophyllum peltatum*) BENEATH IT. THIS IS JUST BEFORE THE FLOWERS COME OUT.

Note the flowers of the Judas Tree, how they have blossomed out only on certain limbs of the tree—and that long before the leaves appear. They are bright pink and very conspicuous during the earliest days of spring. This particular tree is well known to many Washingtonians; it is on the right-hand side of the road as we approach the Pierce's Mill bridge.

large round 7-9 lobed leaf, peltate in the middle, like an umbrella; flowering stems bearing two one-sided leaves, and a nodding white flower from the fork." (See figures.) Upon first blooming, they are quite fragrant, and the pale green bractlets of the flower buds fall off very early. May Apples are perennial, their rootstocks being after the creeping order, and throwing off thick, fibrous roots; while the fruit, which is really a "berry," is many-seeded,



FIG. 2. THIS IS A VERY HANDSOME SPECIMEN OF THE MANDRAKE. SOME OF THE PETALS OF THE LEFT HAND FLOWER HAVE FALLEN OFF, THUS SHOWING THE FRUIT AT ITS EARLY STAGE OF FORMATION

Note on the right-hand side where a leaf has grown through an opening in a dead oak leaf that chanced to cover it on the ground where the mandrake started; it has strangled it, and that plant never came to anything

and usually grows to become about two inches in length, the form being more or less ovoid or egg-shaped. We often find great patches of these Mandrakes growing in the rich soil on the banks of streams and creeks flowing through wooded areas; but then, again, an acre or more of them may cover some hillside, in a similar soil, where big trees of various species form a belt of timber.

Podophyllum has long been used in medicine as an efficient cathartic and for a few other purposes; however, modern physicians seem inclined to discard it. It belongs, with a few other plants, in the Barberry family (*Berberidaceae*)—in so far as the flora of the northeastern states of the United States go. Twin-leaf, Umbrella leaf, Blue Cohosh, and Barberry are well known representatives of the same group. All of these occur in the

flora of the State of Virginia and in many places this side of the Mississippi River.

The leaves and roots of the Mandrake are poisonous, and children should be cautioned in regard to chewing them. The odor of the flowers is very disagreeable to some people; but then, tastes differ very materially with respect to the fragrance of flowers, and quite a long story might be written on this subject.

Mathews informs us that Mandrakes are never found growing wild in Maine, while the plant is rare in Vermont and New Hampshire; as we proceed further southward it becomes more abundant. Indeed, in the greater part of New England, its place is taken by the well known



FIG. 3. THESE SPECIMENS OF THE MANDRAKE ARE TAKEN *in situ* AT THE FOOT OF AN OLD OAK TREE

The plant in the foreground exhibits the fruit when it is about halfway advanced toward maturity. Other plants nearby had their fruit almost ripe upon them.

Skunk Cabbage, which, it must be believed, is by no means an agreeable exchange.

In the flower world of the eastern United States, we have another most interesting plant in the Wild Lupine, also called Wild Pea and Sun Dial—less often Old Maid's Bonnets. Aside from the matter of color, one may gain a very good idea of it by studying Figures 5 and 6 of the present article. A well-developed plant of this species may grow to become at least two feet in height; and

should twenty or thirty others of similar proportions be in the same group, the whole forms a picture that will live in the mind of the nature lover for many a day—nay, for many a summer to come. Sometimes its flowers are a pale pink, though rarely, and still less often pure white. They have been described as “butterfly-shaped;” but this is a bit far-fetched, as a glance at Figure 6 will prove. In arrangement they form a long raceme on an erect stem; the leaves are of a particularly fine green color, and of a compound arrangement, generally composed of eight or nine leaflets arranged in a circle. When the Lupine fruits, its four or five seeds are contained in a pod of some two inches in length; it is a hairy affair—broad and flat.

Lupine is generally found growing on gravel banks or gravelly hillsides, and sometimes on sandbanks that

advantage gained in the pea-shaped blossom? As usual, the insect that fertilizes the flower best knows the answer. The corolla has five petals, the upper one called the standard, chiefly a flaunted advertisement; two side wings, or platforms, to alight on, and a keel like a miniature boat, formed by the two lower petals, whose edges meet. In this the pistil, stamens, and nectar are concealed and protected. The pressure of a bee's weight as he alights on the wings, light as it must be, is nevertheless sufficient to depress and open the keel, which is elastically affected by their motion, and to expose the pollen just where the long-lipped bee must rub off some against his under side as he sucks the nectar. He actually seems to pump the pollen that has fallen into the forward part of the keel upon himself, as he moves about. As soon as he leaves the flower, the elastic wings resume their former position,



Fig. 5. THIS IS A BED OF WILD LUPINE (*Lupinus perennis*) AS IT FIRST COMES INTO FLOWER IN THE SPRING. IT HAS NOT BEEN DISTURBED IN ANY PARTICULAR, SO ITS BEAUTIFUL LEAVES AND RACEMES OF ELEGANT PURPLISH-BLUE FLOWERS CAN BE APPRECIATED IN ALL THEIR GLORY

Lupine belongs in the Pulse family (*Leguminosac*)—a very extensive group of trees, shrubs and plants; it even contains the *Julus* tree, here shown in Fig. 1.

are utterly lacking in moisture. Should they remain undisturbed for several consecutive seasons, and the locality be particularly favorable to the growth of the plant, the group may eventually cover an area of fifty or sixty square feet—a wonderful sight indeed! It has a root that often finds its way into the soil for a distance of several feet—thus the plant is rarely taken up successfully for transplanting to gardens; so it is fortunate that it may readily be introduced through planting its fertilized seeds.

Speaking of its fertilized seeds, Neltje Blanchan has, with marked significance, described how this fertilization comes about in the flowers of the Pea family generally. It is most delightfully put, and she asks, “What is the

thus closing the keel to prevent waste of pollen. Take a sweet pea from the garden; press down its wings with the thumb and forefinger to imitate the acting of the bee on them; note how the keel opens to display its treasures, and resume its customary shape when the pressure is removed.” (*Nature's Garden*.)

Another interesting fact about wild lupine is that, in common with some other plants, it dozes off after the day is over. The leaves do not change position from an horizontal to a vertical one, as in other members of the legume group, but they twist about on their own axes—sometimes as much as through an entire half arc of a circle. This may be a diurnal trick as well as a nocturnal one—hence the term “sun-dial” applied to several of these

plants. Some of these movements are wonderfully complex, and must consequently mean a great deal to the plant possessing them. In this wild lupine the leaves fold themselves about the stem below, parasol fashion; or the reverse movement may take place, the leaflets extending upwards to close up and in line with the stem that supports them. A number of explanations have been put forth making for a solution of these phenomena; but the subject is too extensive a one to take up in the present connection. It is brimful of interest, nevertheless, and deserves to be carefully and exhaustively studied.

As a matter of fact, the study of the morphology of flowering plants and their physiology is one of the most fascinating lines of research in all nature. When one comes to think of it, the opening and closing of such flowers as our common morning-glories and allied *Convolvulaceae* is an extraordinary phenomenon. That it should take place only at night or on very dark days is a



Fig. 4. FULLY RIPE FRUIT OF THE MAY-APPLE OR MANDRAKE (*Podophyllum peltatum*).

Observe how the fruit stems spring from the point of the parting of the bases of the leaf-stems. The leaves themselves are of an elegant green, and the fruit is a rich yellow.

most interesting fact; and that the movement in closing is always in the same direction is another point worthy of close study. What is the necessity for the closing up of the leaves of sensitive plants and trees upon slight pressure from one's fingers, and then opening again in a little while? Why should the species referred to present such a remarkable habit, while it is seen to be entirely lacking in others?

Grafting and its results still hold many a secret not yet revealed to science, and the same is true of cross-fertilization. Indeed there is absolutely no end to the list of secrets still to be discovered through researches in structural and physiological botany, by those who devote their time and minds to problems of this nature. Much research work of this class has already been done; and doubtless, when the temporary checks caused by the war shall have ceased to exist, a great deal more will be undertaken.



Fig. 6. A SINGLE SPIKE OR RACEME OF THE LUPINE IS ONE OF THE GLORIES OF THE PLANT WORLD DURING THE EARLY SUMMER MONTHS IN THE REGIONS WHERE IT FLOURISHES

Lupine derives its name from the Latin of wolf, *lupus*, for the reason that superstitious people believe that the plant exercises its power to devour the soil's fertility.

NOTES ON THE AMERICAN SNAPPING TURTLE

To one who has paid any attention at all to our freshwater turtles, surely the common Snapping Turtle is no stranger. Two species of it is represented in the reptilian fauna of this country, and both belong in the family *Chelydridae*. Of these two forms the smaller occurs, in suitable localities, all over the eastern parts of the United States, and westward to the Rocky Mountains. Southward it ranges into South America, and may be found in many parts of Mexico and Central America, in which latter countries there is still another species which is not found within our borders. In other words, there are three North American species, or two in the genus *Chelydra*, and the big fellow known as the Alligator Snapping Turtle, which is the sole representative of the genus *Macrochelys*. These animals are the largest of our

chelonian species, especially the last-named, specimens of which have been taken that have weighed upwards of 140 pounds, or more. These are confined to the southern parts of the United States, in the sluggish rivers and swamps (*M. lacertina*), while our common snapping turtle, although very much smaller than the Alligator snapper, is considerably larger than any other United States chelonian; in fact, they are as pygmy and giant as compared with each other.

The present brief sketch will be devoted to our common Snapping Turtle, the scientific name for which is *Chelydra serpentina*. Captive specimens of this species have been in my possession many times, young as well as adults at various ages. Moreover, it has been studied in nature from one end of the country to the other; and

when opportunity has offered, negatives have been made by me from life. Prints from three of these have been reproduced to illustrate this account of its life and habits.

The young are generally dark brown on the upper parts, with a deep shade of ashy gray for the under parts. Older specimens are much lighter above and yellowish white beneath. There is considerable variation in these tints, however, while other characters are far more constant. For example, the under side of the tail exhibits a series of large shields, as compared with the scales of the Alligator snapper in the corresponding locality. On the back (*carapace*) of our snapper there are three longitudinal ridges—a median one, with one upon either side of it. Big snappers will come to weigh upwards of fifty pounds—rarely over forty in nature; and they have a length of shell that measures an inch or two over a foot. In some parts of the country, more particularly in New England, snappers are often kept in the "swill-barrel," where they become inordinately fat and heavy, and are then said to make fine soup.

In young snappers the tail is very long in proportion to the rest of the body. Practically, this character is manifest throughout life, while, as in all aquatic chelonians, the feet are broad and paddle-like, and evidently adapted to powerful swimming. Snappers are unable to draw into the shell either the head or the tail; much less are they able to close the shell in front or behind, as do our well known land tortoises (*Terepene*). They are pretty tough, however; not easily observed in their native element, and vicious to a fault. Personally I have never met with a mutilated snapper in nature, while box tortoises are frequently found that exhibit the result of various injuries, the

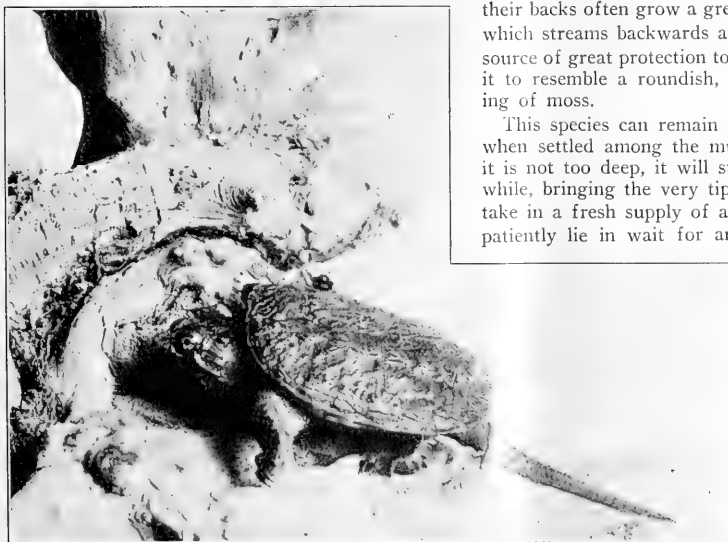


Fig. 7. THIS YOUNG SNAPPING TURTLE IS ABOUT SIX MONTHS OLD. NOTE THE GREAT LENGTH OF ITS TAIL AND ITS WONDERFULLY BRIGHT EYES

At this age the upper surface of the shell of the young *Chelydra serpentina* is dark brown, and very rough superficially.

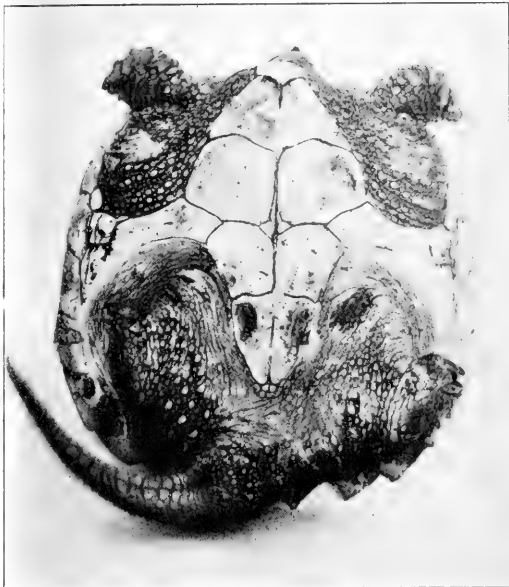


Fig. 8. HERE IS A MUCH OLDER SPECIMEN OF THE AMERICAN SNAPPING TURTLE THAN THE ONE SHOWN IN FIGURE 7. THE SCALES ON THE UNDER SIDE OF THE TAIL ARE PLAINLY SEEN, AS WELL AS ITS BIG, PADDLE-LIKE FEET

Observe the defenseless state of the body in this Snapper, and the peculiar formation of the small, clongate plastron, with its overlying plates of pale yellow.

majority of which have been at the hands of man. Snappers possess splendid powers of sight, notwithstanding the fact that their eyes are small, and probably their other senses are more or less well developed. In nature as well as in aquaria their backs often grow a great mass of dark green, wavy moss, which streams backwards as they swim along, and which is a source of great protection to the animal, in as much as it causes it to resemble a roundish, flat brown stone, having a covering of moss.

This species can remain under water for a long time; and when settled among the mud-covered rocks, in places where it is not too deep, it will stretch its neck out once in a long while, bringing the very tip of its snout out of the water, to take in a fresh supply of air. In such situations, too, it will patiently lie in wait for any hapless fish, duckling, or frog

that may swim over it; and should it come within reach—quick as a flash its long neck is protruded, its unsuspecting quarry seized, drowned or killed, and subsequently eaten by this most voracious of chelonians. The bite of a large snapping turtle may be very severe indeed, especially should it succeed in getting hold of a finger or toe; for its sharp jaws can snip such a member off as clean as though done with an ax.

Should a snapper, lying in wait for food, find that nothing is

coming his way, he will sally forth along the bottom of the muddy pond or sluggish stream in which he lives and capture such forms as he can. He has a wonderful control over the muscles of the neck and the lightning-like protrusion of the latter. Look out for your fingers and face while handling a big, healthy one; for not only can he thrust his head and neck forward in a straight line, but to either side and backwards over his shell as well. Indeed, the only safe way to pick one of these fellows up is in the same manner that we pick up a skunk—by the tail, though not, as we know, for the same reason.

There is a very great difference in the temperament of these turtles. Some of them become gentle in captivity and attached to their keepers, taking food from their hands and exhibiting other evidences of familiarity. Upon the other hand, other specimens remain as ugly and as vicious as those in nature, and will snap at anything or anybody within reach. They only feed *under water*; and many die in captivity for the reason that this imperative demand is either unknown to those who undertake to rear them, or it is otherwise ignored.

Their breeding habits are pretty well known, for their eggs have been discovered many times. In New England, along in May, the female becomes restless and eager to deposit her clutch of round, white eggs, that have thin, tough shells; she rarely goes further than fifty feet

from the stream or pond that is her home, usually much less. Having found a soft spot to her liking, she settles down in it by using her feet, trowel-fashion, upon either side of her. As she disappears by the earth closing in over her shell, she soon gets far enough out of sight to answer her purpose; and when so situated she lays her entire clutch of eggs, often to the number of a couple of dozen. Then, by a gentle, swaying movement, she works her way to the surface again, and in

doing so, the loose earth falls back over the eggs, entirely covering them. In due course the eggs all hatch out, as do the eggs of other reptiles under similar conditions. When first hatched out, the young turtles are very dark colored and wonderfully cute little fellows, being frequently kept in aquaria, where they are, however, rather dangerous additions on account of their fondness for feeding on the other inhabitants. Upon hatching out, it would be interesting to know how these little chelonian tots find their way to their native element, for their size, strength, and range of vision

are all apparently totally inadequate to the accomplishment of such a feat. In some situations, a heavy fall of rain would probably help them out through the flood or overflow that would naturally take place, thus widely extending the usual limitations of the pond or stream wherein reside the parents of the otherwise helpless little crew.



Fig. 9. THIS IS THE SAME SNAPPER WHICH IS SHOWN IN A PREVIOUS ILLUSTRATION (FIG. 8). THE SHELL IS COMPARATIVELY VERY SMOOTH AT THIS AGE, AND ITS HORNY PLATES ARE WELL DEFINED.

It is interesting to note the way in which the head sags down far below the anterior margin of the carapace when the animal is resting in this position. The generic name of this species, *Chelydra* (and *Pseudemys* is from the Greek, it having its overcast time, been applied to a kind of tortoise or any hibernous serpent; the specific name, *serpentina*, refers to its habit of thrusting its head and neck forward like a serpent when striking.

RAILS, GALLINULES AND COOTS

(Family Rallidae)

BY A. A. ALLEN

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THIN as a rail" is an expression that applies as well to any of the members of this family of curious birds as it did to the parts of Abraham Lincoln's famous fence. For the rail is a marsh dweller and nature has provided it with a compressed body like that of a flea, to enable it to slip better through the dense vegetation.

There are about 180 species in the family but only fifteen are found in North America, and of these only

four or five are common even in the most suitable localities. By most people they go unseen and unknown, for unless one haunts the marshes, he is apt never to see one. When a coot or a rail meets with an accident on its migration and is picked up by the corner grocer or the editor of the local newspaper, it always causes considerable excitement in the community for it is usually diagnosed as a hybrid between a duck and a chicken, or, if it is one of the smaller species, a cross between

a snipe and a quail. All of the members of the family have rather long, stout legs like fowls, but their toes are always long and slender to distribute their weight when running over the soft ooze or the floating vegetation. The coot has lobes on each side of its toes to assist it in swimming, for it is much more aquatic than the other species and, like ducks, often assembles on the open water in large flocks. All species have longer necks than ordinary birds and much shorter tails, which, like domestic fowls, they hold erect. They resemble fowls

also in having short, rounded wings, but their feathers are longer and softer giving their plumage a somewhat hairy appearance. The gallinules and coots, and the sora, yellow, and black rails, have short, thick, pointed bills but the Virginia, clapper, and king rails have rather long, slender, and somewhat decurved bills.

The coot and the Florida gallinule, which are perhaps the best known members of the family, are sometimes called "mud hens" or "water chickens."

They are similar in general appearance, being uniformly slate color and about the size of bantams. If one cannot see the lobes on the toes of the coot, another good field mark is the ivory-white bill which in the gallinule is red and green. Both species have what is called a frontal shield, a horny prolongation of the bill on the forehead, which is not found on any of the rails.

In the gallinule it is bright red and quite conspicuous but in the coot it is brownish and much smaller. When swim-

ming both species are quite ducklike, but their heads are smaller and they are continually jerking them after the manner of pigeons. When flushed they patter along the surface for a considerable distance before they rise but when fully on the wing, they resemble small ducks. Seen on land or walking along the border of a marsh, on the other hand, they do not resemble ducks in the least but appear more like busy little hens, picking at everything as they step along, lifting their feet rather high and putting them down carefully as though they were always



DUTY CALLS

The Florida gallinule or water chicken returns to its nest in the cat-tails. Note the conspicuous frontal shield or prolongation of the bill on the forehead.



"THIN AS A RAIL"

The bodies of rails are compressed like fleas to enable them to slip better through the dense vegetation

sneaking up on some wary insect or luckless tadpole.

They are never so cautious, however, with their voices and some of the most startling sounds that ever come from the marshes can be traced to them. Their ordinary calls are somewhat hen-like: *cut-cut*, or *cak-cak*, but occasionally they give vent to a startling, *wup, pup, pup, pup, pup, pup*, or *wup-wup-wup*. Like the rails they are especially noisy early in the morning and at dusk, and occasionally they break out in the middle of the night.

Coots and gallinules build their nests of dried rushes close to the water level in the marsh vegetation, the coot usually in



FINAL INSTRUCTIONS

The two Virginia rails are about to exchange places on the eggs and Mrs. Rail is giving the last word of caution to her dutiful consort before he takes his turn.



BACK ON THE JOB

The Gallinule is incubating and has ruffled its feathers to keep cool. The nest is built up from the water with dead rushes.

deeper water than the gallinule and in more open situations. Often they have to add to their nests during periods of high water to keep the eggs dry. The eggs are buff in ground color, rather evenly marked, the spots on the coot's eggs being smaller and blacker than on those of the gallinule.

The young birds are covered with black down when hatched, the coots being curiously ornamented with a fringe of orange whiskers. They are able to run and swim shortly after hatching and follow their parents about, hunting for food. It is an interesting sight to see a family of gallinules threading their way along the border of a marsh, the old ones continually calling and the young constantly peeping so that they will not get lost. As though to give the young something to follow, the old birds continually flash their white under tail coverts as they jerk along. At times the young get tired and crawl up on the back of the mother or again she calls them all to her and broods them for a while on little

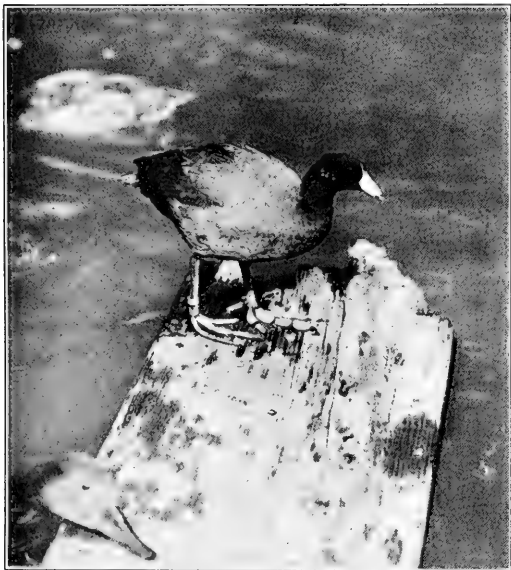
platforms of rushes or temporary nests which she constructs.

In the southern states another species of gallinule is found. It is much brighter in coloration and thus gains for itself the name of purple gallinule. It is not so seclusive as the Florida gallinule and in shrubby marshes often climbs up on the bushes to bask in the sun.

Of the rails the commonest and best known is the Virginia rail, a bird about the size of a robin but of very different shape with its small head, long bill, and long legs. In general color it is dark brown, somewhat streaked on the back and redder on the breast, the flanks being barred with black and white. It is found even in small marshes, from the Atlantic to the Pacific, nesting from the Middle States to Ontario and British Columbia, and wintering from the southern part of its breeding range to Central America. It is often heard but seldom seen for it is rather difficult to flush even when one fol-

lows its notes out into the marsh. It seems to prefer to dodge through the thick vegetation like a mouse, sometimes when cornered, doubling back almost between one's feet to avoid flying.

The Virginia rail arrives from the south on its nesting grounds from the middle to the last of April when the marshes are still flooded and the new vegetation is just beginning to show green. Nevertheless one needs patience to find the birds even at this time though their notes are almost as frequent as the croaking of the frogs. The first notes heard in the spring are not very different from the spring call of the peeper but soon one hears a note that might be called its song. *Cut-a, cut-a, cut-a, cut-a, or racket, racket, racket, racket*, comes from a little clump of brown cat-tails, almost thin enough to see through and yet, try as one may, one cannot see the bird.



A CAPTIVE COOT

The coot is sometimes called a "mud hen." Note the white bill and the lobes on the toes.

As soon as the vegetation grows high enough to afford some protection, nesting begins and the marshes resound with their cries even during the night. A hollowed platform of rushes is built in a clump of vegetation just above the water and the tips of the flags or sedges are pulled down until a sort of a roof is formed to conceal the sitting bird from enemies passing over head. The young rails are similar to the young gallinules but of course are smaller. They are able to run about almost as soon as hatched but if danger is near and the parent birds think they are not traveling fast enough, they do not hesitate to pick them up by any convenient appendage and hasten off with them. The writer once attempted to confine a nest full of young rails by placing an enclosure about the nest, but the old birds without the slightest hesitation,



A LEAKY ROOF

But it serves to hide the Virginia rail from enemies that fly over head. The rails always pull the tips of the growing vegetation down over the nests in this way.

flew over the fence with the young ones and carried them further into the marsh.

A larger edition of the Virginia rail and much less common, except in some of the marshes of the Middle West, is the king rail. Its color pattern is almost an exact counterpart of that of the Virginia rail but it is almost twice the size. A much paler species but otherwise similar to the king rail, is the clapper rail, found only in the salt marshes. The clapper rails of the Pacific



A VIRGINIA RAIL AT HOME

Note the long, slightly decurved bill.



ON THE FENCE

This Virginia rail is about to carry its young out of the enclosure. Note the short rounded wings.

coast are somewhat browner than those of the Atlantic marshes and constitute a separate species.

The sora rail or sora is about the size of the Virginia rail but is more olive in general color with grayer underparts. Its bill is much shorter and heavier and is bright



IS THE COAST CLEAR?

A Sora rail sneaking up to its nest in the marsh grasses.

yellow in color. Indeed the bill is the most conspicuous part of the bird. Often when the sora is flushed, the bill is the best mark by which to distinguish it from the Virginia rail. In habits the two birds are very similar being equally difficult to discover and when finally flushed, both fly but a short distance with dangling legs and apparently feeble wings before dropping again into the marsh. It is practically impossible to flush either species

a second time. Indeed on one occasion when the writer was tramping through a rather extensive marsh, his attention was attracted by a yellow spot close against the water. Looking more closely, he discovered a sora rail crouching low and expecting to be passed unnoticed. So completely did it rely upon its protective coloration, that it permitted itself to be touched before it attempted to escape. The eggs of the sora rail are darker in ground



CARRYING HER BABY

The Virginia rail has picked up one of its youngsters by the leg and is hastening its departure from the vicinity of the camera.

color than the Virginia's and the downy young are ornamented with a tuft of orange whiskers on the chin and a brilliant red cere like a ball of red sealing wax above the bill.

There are two other rails found in the United States and Canada but both are rare. The yellow rail is some-



"WHOSE BLACK BABY ARE YOU?"

A young Florida gallinule only a few hours old.



A HOME IN THE MARSHES

This nest of a Sora rail is in a large plant of the Arrow arum.

what similar to an immature sora but is considerably smaller and can be distinguished by a white patch in the wing. The black rail is the smallest and least known of them all, being but little larger than a wren. Since it darts around like a mouse through the grassy marshes and is seldom flushed, it is scarcely ever seen even where it is nesting.

Rails on the whole are not very intelligent birds and because of their life in the dense vegetation have apparently become very short sighted. They are quick to detect motion but if one remains perfectly still, they will some-

times approach and even run over one's feet. With their short rounded wings and soft plumage, it is not to be wondered at that they prefer to run rather than to fly, but it is surprising to discover what long distances some of them traverse on the migration. Sora rails, for example, regularly migrate to South America and on one occasion, at least, a sora has flown across the Atlantic to Great Britain.

Rails, gallinules and coots are all considered game birds and are shot in considerable numbers, especially



Photograph by H. L. Sharp

A SORA'S PROSPECTS

Three of the eggs have hatched into little black powder puffs that are curiously ornamented with tufts of orange whiskers beneath the bill and drops of red sealing wax above.

in the South. The rails are very small, however, their flesh is of inferior quality, and they are such weak flyers that they furnish a very low grade of sport for hunters other than boys.

SOUTHWESTERN FOREST SUPERVISORS HOLD IMPORTANT CONFERENCE

HOW to obtain an accurate inventory of the timber of the Southwestern National Forests, to determine the extent of past cuttings, to secure growth and yield figures, in short to lay a better foundation for scientific management of the Forests, was one of the chief topics of discussion at the meeting of the fifteen supervisors and the district officers of the Arizona and New Mexico Forests, who met in Albuquerque, New Mexico, during the week beginning February 10th. A workable scheme for an extensive program of silvicultural management was presented and approved.

Many other problems of Forest administration, particularly those dealing with publicity, land classification,

education, game, fire protection and grazing were debated.

The timber sale business in the Southwestern district is large. In the fiscal year 1918, 121 million feet were cut under sale contracts, having a value of \$273,500.00.

At this meeting was displayed a device for more accurately determining the location of forest fires, invented by W. H. Gill of the Albuquerque office of the Forest Service. The device, called a cameragraph, is a proposed substitute for panoramic maps, which have been extensively used in both eastern and western Forests, especially in connection with the Osborne "fire-finder" in the northwestern Forests.

Forestry for Boys and Girls

by E. G. CHAYNEY

THE PINE WOODS FOLK

SQUEAKY CHIPMUNK MAKES A DISCOVERY

By E. G. CHAYNEY



SQUEAKY CHIPMUNK woke up with a very distinct feeling of chill and decided that someone must have left the front door open. He did not tear up to the door excitedly to see what had happened as he ordinarily would have done—for the truth was that he was only about half awake. In fact he had been only half awake for several weeks. Ever since the snow had closed over the entrance to his house he had been sleeping most of the time when he was not eating. He had had some awful dreams of the food supply giving out before the snow melted.

"That's what it is," said Squeaky, suddenly wide awake at last, "the snow must have melted."

He gave one sharp squeak to his sleepy little wife and rushed up the narrow passage to the doorway. Sure enough, the snow was gone and the sun shone full in his face. The sun blinded him at first after the long weeks he had spent in the dark and he blinked contentedly in the warm sunshine without seeing much.

Slowly it dawned on Squeaky that he could hear a strange, rasping sound not so very far away. His curiosity was almost eating him up and he strained his eyes to look through that dazzling sunlight. Gradually things began to take definite form. At last he could see. Sure enough there was that old prickly porcupine eating all the bark off of one of those very Norway pine trees which Chatter Box's grandfather had planted. Squeaky was terribly excited.

"Hey, you old quill pig," he screamed, "Stop that right away!"

Porky stopped eating and listened a minute. He did not hear anything more and started to eat again.

"Did you hear what I said?" Squeaky screamed again as he hopped excitedly to a stub on the top of the old dead log.

Porky paused again and looked curiously around to see where the sound came from. He saw Squeaky and settled comfortably down onto a tiny little limb which did not seem nearly large enough to hold him and prepared to talk. He had not seen any of his friends for some time and he was quite ready for a friendly chat.

"Hello, Squeaky," he called down cheerfully, "did you speak to me?"

"Did I speak to you?" Squeaky shouted, tweaking his little tail angrily, "I screamed at you as loud as I could."

"Well," Porky said pleasantly, "you see I make so much noise knowing off this bark that I have a

hard time hearing anyone else."

It was hard to stay angry with anyone who spoke so pleasantly and Squeaky began to feel a little bit ashamed of himself. He hoped that not heard him "quill pig."

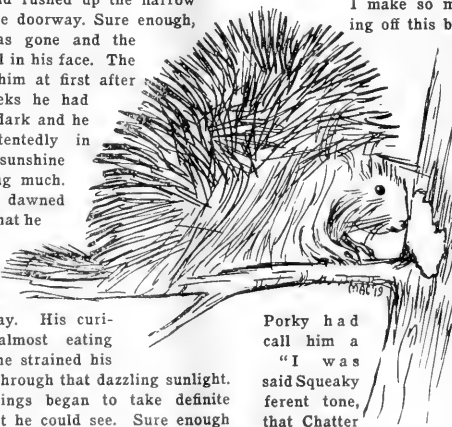
"wondering," in a very difficult if you knew Box's grand-

Porky had call him a

"I was said Squeaky ferent tone, that Chatter father planted that tree that you are eating up?"

"Is that so?" said Porky looking at the tree with a new interest.

"Yes," said Squeaky, feeling quite important, "he buried a cone there and those three trees grew from it."





"Well, well, well," said Porky, "I guess it's the only good thing that he ever did."

Squeaky felt a little taken back. "But you will kill it that way," he remonstrated.

Porky looked thoughtfully at the four feet of trunk that he had skinned. "I expect it will," he said indifferently, but I have to eat something."

"Why don't you eat some of those little popples?" Squeaky suggested. "They grow faster and no one would miss them. That tree there has been forty years growing up and you will kill it in three or four meals."

"That's a fact," said Porky, "I never thought of it in that way. I usually do

eat those small popples, but I saw old Longfang, the wolf, yesterday and he looked so hungry I climbed this big tree to sleep."

"Look out!" Porky shouted suddenly.

There was a rush and a vicious snap as Longfang's cruel teeth closed on the place where Squeaky had been. It was a narrow escape and Squeaky was huddled close up in the end of

the long passage with his heart pounding against his ribs. "After all," he thought, "there are some people worse than old Porky, even if they do not eat trees."



THE PUSSY WILLOW

Said the fuzzy pussy willow,
As he ruffled in the breeze,
"I surely am the handsomest
Of ornamental trees.

"When the snow is mostly melted
And the flood is on the flats,
My kitten willow budlets
Turn to pussy willow cats."

SWAMP TREES

(Answer to Boy Scout Question No. 1 in January)

Our swamp trees do not as a rule grow in the stagnant swamps because they like it. They are there because they have the ability to exist under those unfavorable conditions where very few of the other trees could grow at all. That is, they have gone in there to escape competition.

The tamarack, the cypress, the black spruce and the white cedar are all con-

sidered typical swamp trees. But take those same trees out of the swamp and put them in rich well-drained soil where they will be protected from the competition of their stronger enemies and what happens?

They grow about twice as fast as they did in the swamp because the roots get plenty of fresh air. The swamp is an unfavorable location and no tree will do its best there.

THE EFFECT OF SHADE

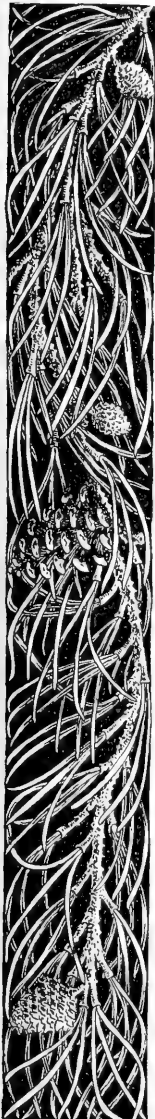
(Answer to Boy Scout Question No. 2)

You have probably noticed that when two trees are growing close together most of the limbs are on the outside and the trunks of the trees will be practically free from limbs on the sides next to each other. This is because the limbs are unable to grow in the shade. It is the same cause

that cleans the limbs from the trees in dense forests and makes them grow with tall clean boles, when those same trees if grown in the open and singly would probably have many limbs coming almost down to the ground.

This is true to a certain extent of all

(Continued on Page 1016)



DIGEST OF OPINIONS ON FORESTRY

WILL YOU NOT CO-OPERATE WITH US BY IMPRESSING UPON THE EDITOR OF YOUR NEWSPAPER THE IMPORTANCE OF FORESTRY? WRITE TO YOUR NEWSPAPER

BOSTON HERALD.—The presence in Boston of the New England Forestry Congress reminds us of certain facts whose bearing upon the industries and prosperity of the land our people are only beginning to realize. The relation of forests to rainfall is a recent concept in physical geography. The older text-books contain but slight reference to the subject. Within the last quarter of a century science has reached the conclusion that the conservation of forests near the headwaters of great rivers is essential to preserve the fertility of the agricultural lands in the watersheds, to maintain the navigability of the rivers and prevent destructive freshets and to supply the waterpowers of which Mr. Harriman spoke in his address before the Congress.

Chicago Daily Tribune.—It is doubtful if there is in the whole Middle West a district that lends itself more readily to the purposes of a national park reserve than the dunes at the south shore of Lake Michigan. Why not the Roosevelt National Park in the dunes of Northern Indiana?

Chicago American.—If the Roosevelt memorial is to be in the forest preserve, why not have a forest for a memorial? Let the Park Commissioners set aside 500 or 1000 acres out of the 13,000 of the preserve and plant a great forest as a Roosevelt memorial.

Dayton News.—The Kiwanis Club, of Washington, has sent to every other Kiwanis Club in America a request to join in the planting of memorial trees for soldiers and sailors who lost their lives in the great war. Each Kiwanis in the United States is urged to see to it that a memorial tree is planted for every one of its members who died or was killed while serving in the Army or Navy, and it is understood that the recommendation has been received with general approval.

Grand Rapids Press.—"If the State of Michigan would simply enforce the law requiring railroads to keep spark arresters upon the smokestacks of their locomotives the northern countries would become reforested within 25 years," said a Kent circuit judge Tuesday. "The law is plain, and I have called the attention of certain State officials to it several times, but no action has been taken."

Jacksonville Times-Union.—In this State the law forbids the setting of fires, for any purpose, except between the first of February and the last of March, and all good citizens should try to have the law enforced. The fires allowed are only to be started after due notice to people living within two miles of the lands being cleared or pasture lands, and public sentiment is turning against any fires in the grazing lands.

Springfield (Ohio) Sun.—The idea of planting a tree for every soldier who died for his country, making an avenue of noble, living things, which shade the wayfarer for all time to come, is peculiarly fitting, and Springfield seems about ready to adopt this plan of commemorating the heroic sacrifice of her four-score and ten sons in the war with Germany. The idea of memorial trees would seem to make visible that glorious immortality for which every soldier laid down his mortal body.

Dallas (Texas) Journal.—The American Forestry Association has suggested that every community in the United States shall take steps to make its community Christmas tree permanent; that it shall use a living, growing tree for Christmas purposes; that trees for this purpose shall be planted and cared for. Millions of trees are ruthlessly destroyed at every Christmas season to serve unnecessarily a temporary purpose.

Huntington (Ind.) Herald.—Our American boys ought to be remembered with American trees—elms, maples, poplars, gums, sycamores, hickories, walnuts, pines, cedars, birches or one of the many others that will be both ornamental and useful.

Hillsboro (Ind.) Times.—Thousands of city streets and country roads can be made attractive at comparatively small expense for trees and the labor of planting, and the programs of the dedication can easily be made as impressive as those of Decoration Day. The plan also has merit in its possibilities of indefinite continuance.

Moline Dispatch.—Women of Moline, and some of the men, are becoming increasingly incensed at the cutting down of many of the city's beautiful trees—trees which it takes two human lifetimes to grow, and which are often of more benefit to mankind than are some men and women. It is averred by those most interested in the

beauty of the city that they are being cut down without legitimate reason or excuse. No one should be allowed even to trim a tree who does not know the business.

New Rochelle (N. Y.) Daily Star.—Senator Walter A. Law, Jr., has introduced a bill at Albany that will meet with the commendation of every lover of nature in the State. It amends the village law in relation to the planting, care and preservation of shade trees.

Christian Endeavor World.—Memorials to those that have fallen are a natural sequel of war. The question is becoming a frequent one whether stone and bronze furnish the most fitting monuments. There is a growing feeling that men ready to give their lives for their country would be most honored by being associated with something that is itself of service to their fellow-men. It is finding expression in memorial highways and bridges and parks. One of the recent suggestions is that the best reminder of a noble life should itself have life. The American Forestry Association has proposed that the heroism of our soldiers be commemorated by setting out trees. The reckless waste of our forests has awakened the nation to the need of systematic measures for replacing them. The value, as well as the beauty, of trees is becoming more appreciated. The observance of Arbor Day will doubtless be more general this year than ever before, and in many places it will be closely linked in thought with Memorial Day.

Boise News.—There is a good deal of discussion current about the type of monument to be built to commemorate the men who died for their country. The idea of planting a tree for every soldier who died for his country, making an avenue of noble, living things, which shade the wayfarer for all time to come, is peculiarly fitting. It seems to make visible that glorious immortality for which the soldier laid down the mortal body.

Ironton (Ohio) Register.—If the people of this country do not at once begin planting black walnut timber they will make the mistake of their lives. Now that the war has developed the respective values of foodstuffs, we are coming to understand what we have annually wasted in the walnut crop.

WALKS IN THE WOODS

(II) "AROUND ROBIN HOOD'S BARN" TO THE GRASSY SPRAIN WOOD

BY J. OTIS SWIFT, AUTHOR OF "WOODLAND MAGIC"

(PHOTOGRAPHS BY THE AUTHOR)

A GLINT of gold in the winter sunshine; filmy blue the mountains on the western horizon; a soft haze veiling the Hudson below us, and lazy fish-hawks circling in the ether above the Tappan Zee! The cobwebs of a week's work indoors tangle up our thoughts as we gaze out of the window here in the Manor at Hastings-on-Hudson. Let's get out in the woods and see if we can, perchance, snare the old enchantment once again. You'll come along, just to keep me company, and, too there's a world of interesting things to see over in the Grassy Sprain forest. The old Dutch settlers around Hastings stamped their hallmarks on many things. One was the little Grassy Sprain brook that runs down through Westchester County from up near Pocantico Hills, the home of Mr. Rockefeller, to the Yonkers reservoir.

As we go down an old colonial wood road to the Nepperhan Valley, starlings whistle sharply in the tall tulips and white oaks by Robin Hood's Barn. Robin Hood's Barn, you know, was the wild wood. The way to the silence and restfulness of Nature's laboratories is always "around by Robin Hood's Barn." When our modern philosophers talk of going into The Silence as something new, I recall the old monks and anchorites who used to seek out the woodland caves and rock cells in the fastnesses to commune with their Maker. The silence of the wood, as we go down this path, is so great one may almost hear the rhythmic beating of the big heart of Nature, to say nothing of the soft whispering gossip of black birch and hemlock rehearsing all the scandals of the jungle.

Downy woodpeckers and blackcap chickadees are busy over the grubs in the bark of the dead chestnuts. Neat, lady-like, gray-robed juncos flirt their two white tail-feathers like momentary glimpses of ruffled lingerie peeping beneath skirt bottoms in country dances, as we turn again into the woods off Jackson Avenue beyond Mt. Hope and come suddenly upon a wayside spring under the roots of a gnarled old beech. Revolutionary troops

passing between White Plains and Dobbs Ferry used to eat their noon-day lunch beside this spring. Over these picturesque hills were camped the French army under Count de Rochambeau in 1781 while he and Washington planned the Southern campaign. Some of the most celebrated soldiers of Europe may have stood on the greensward here. Harvey Birch, the American spy, often drank from this pool, and no doubt Washington Irving, who knew every bit of the countryside hereabouts, drew mystic fancies from the shadowy depths where the water

sank away under the mossy bank and crawling beech roots. The beech is covered with deep-cut initials, and some thoughtful soul has carved, right over the drinking place, *Pro Bono Publico*—for the good of the people.

As we sink our lips in the cold water a speckled trout darts out from a recess under the bank, flashing his red-gold spots for a moment in the shaft of sunlight, and is gone. He has been a willing prisoner since the high water last Spring. Pincushion, lichen, and fairy-cup moss is pleated over stone and wet earth. There are deep fern-festooned crevices where it is not hard to imagine that on moonlit nights little old men—gnomes and brownies with frogskin breeches and milkweed-silk doublets, come out to dance with the laughing, frolicking, thistle-down clad naiads and fays from the bullrush fens near the brook below.

You should come along this brookside path from the spring—worn by who knows what lagging feet of hoboes, Ishmaelites and lovers—on a moonlit summer's night when the underbrush is aglitter with the mysteries of glow worms, lightning bugs or phosphorescent wood, and a-whisper with the love-songs of crickets, locusts, cicadas and katydids. Above are the great cathedral arches made by reaching arms of elm, yellow poplar, oilnut and red oak that fill the imagination with strange, incomprehensible throbs of emotion originating in the primordial days when you and I—who knows—instead of



AN OLD COLONIAL WOOD ROAD BY ROBIN HOOD'S BARN

plodding through brake and pink azalea by the brookside, would have been up there sweeping gracefully over yawning, moonlit depths from limb to bending limb and throwing down nuts and sticks to tease the sabor-toothed tiger and cave bear lurking in the shadows.

There is no snow on the ground just now, and we are struck with the beautiful precision with which each sharp awl-like skunk cabbage, green or purple, sticks up through the frosty mud by the brook. This skunk cab-



A PICTURESQUE AND INVITING WOOD PATH IN LATE WINTER

bage, blossoming among the snowbanks and mud-flats in January, is the first flower of Spring, undoubtedly.

What a jungle there is here in the bottom land of black mucky loam! Christmas ferns, Maidenhair ferns, rock ferns, brakes, sarsaparilla, jack-in-the-pulpit, moonwort, snakeroot, pinkster, feverbush, sassafras, and dogwood, all growing year after year, dropping withered leaf and sere stalk back into the mixing bowl to rot and form that wonderful black surface soil that is the fertilizer of the great old forest trees towering above. This is Nature's kitchen where she kneads over and over the earth-stuff for reincarnating her little plant and mighty tree folk. It is her laboratory, workshop, her hospital where she performs miracles of surgery and resuscitation. We reach down among the decayed, lichen-covered roots of an ancient hemlock stump and take up a handful of this wonder-working black loam and ponder over it. It is so clean we would not hesitate to taste it—and yet it is the decay of centuries here in the forest, centuries of bird, animal, insect, plant and fungus life. It is the

stuff that once may have been the bloom on the cheek of an Algonquin maid, or the delicate veining in the lip of the white violet, the tough heart of many an oak or chestnut, or the taloons of eagle or fishhawk. It's the dough from which all this loveliness about us was fabricated, and, after a fashion, from which we, ourselves, came. It comes the nearest to being the mysterious Philosophers' Stone of the Magi, for it is one thing that, with careful conservation and manipulation, turns everything to gold. It is the foundation of the forests which are the foundation of the wealth of the peoples.

Note for a moment the fallen timber in this little patch of wood. There are similar patches all over America. When I visited John Burroughs on his eighty-first birthday the country was anxious about the fuel supply, to get it through the season of 1917-18, and Burroughs agreed with me that if the fallen wood in the forests of



UP AMONG THE GREAT LEDGES THE FERNS ARE STILL GREEN

the eastern states had been gathered it would have gone far toward keeping the Storm King out of the sitting rooms of America that winter. Of course there is the labor problem—but take an old hay rack and a dozen children down any picturesque wood path in Autumn and see how quickly it can be filled with wood-knots and bone-dry limbs that crumble naturally into castles of coals in the open fireplace, and bake apples such a candied brown on the hearth in front. Clearing up the under-

brush gives young trees a chance, avoids forest fires, and obviates the necessity of cutting down many live trees for firewood.

A tree has such a personality, a possibility for vast good to the race to be considered, that no one should cut it down without due thought and care. When we have learned to respect our forests as we do our livestock, America will have laid the foundations for solving many a tragic economic problem looming so darkly now. Mankind in his primitive days lived in the forests. He fled there for protection as to a mother in his infant centuries. Robin Hood sought sanctuary there. The hunted outlaw flees him to the greenwood tree. You and I are out here today for rest and comfort in the strength of the forests. When we in America have spent our rich inheritance in thoughtless living, our streams are drying up, and the desert stretches across the continent without the voice of bird or animal, and our fields are running out—we'll return to the protection of the forests as once they protected and cared for us, or we'll go the way of Tyre, Sidon, and the dodo. Not only must we protect the Adirondack forest, the great national parks, the White Mountains, but also every little woodlot all across the country like this at the Grassy Sprain.

Right here on the edge of the bog, among the grass-roots, ox-eyed daisies and buttercups, last Spring, I found the round leaved orchis, though it does not grow commonly back in the bog where the marsh marigold, the cowslip, grows. I took it home for my wild garden and expect great things of it next Spring. Incidentally it is interesting that so many beautiful denizens of the wild wood grow in one locality and do not appear in some other close by. The wake-robin grows everywhere along the Palisades on the west side of the Hudson, for instance, but I have never found it in Hastings on the east side of the river.

While I am taking you along the State road to show you where the watercress grows under a bridge in the Sprain brook, and where the closed gentians are the color of the bluebird's back in Autumn, where in the deep woods the box turtles lie luxuriating in the cool edges

of the swamp on hot summer days, I want to tell you what I heard of the conversion of a very dyspeptic, cross, material-minded man whose boast it was that there was nothing in the world that couldn't be understood by his common sense, and that he was from Missouri, anyway. He was told by his physician that if he didn't get out into the woods for a summer, he would die. He didn't want to die, somehow, and so he came out here into the Grassy Sprain forest, grumblingly and complainingly, as a man going to his grave or a prison. In a juniper grove where the gray squirrels woke him every morning with their peculiar scolding, he lived all summer in a tent with only the great shagbark hickories, white oaks, hemlocks and junipers for companions. He went almost naked in sunshine and rain, cooking his own food like a hunter, and when he went back in the Fall, the color of a brown nut and with added chest expansion, he had not only

regained his bodily health, but his boyish heart and a close knowledge of the habits of all the birds, animals and trees. What seemed to me more important, though, was that through the long evenings sitting in his hammock by the campfire and listening to the music of whip-poor-will and veery, he had gained a suspicion that there were, perhaps, in the mystic pathways where rabbits flitted silently; in the caves under mossy stumps, and in the moonlit spaces along the brookside, tribes of eerie Little People who



LOTS OF FALLEN TIMBER IN THIS LITTLE PATCH OF WOOD

spent their days painting the delicate tints into the jewelweeds and dogtooth violets, and coloring the pink mushrooms and fungi, and their evenings dancing, probably, on mossy stones up among the great ledges where, as we pass, we find the Christmas fern still green this winter day. I don't say he believed these things, mind you, for who really knows? But when he went back to the town in the Autumn he was no longer sure there were not things in the world that he had never seen with his two cold, disbelieving eyes. That very suspicion, that there might be things he didn't know about, filled his mind with a new and delicious delight, a sense of baffling mystery, and started it growing again. He had found a new interest in living, and, more important, in dreaming, and he was no longer a cynic.

THE first school of practical forestry in Scotland was recently opened at Birnam, in Perthshire. The school building that has been erected at Birnam is itself an example of what can be done in forestry, being entirely built of home-grown wood. At present the school has twelve students. The course will cover two years

and will consist of both practical work and lectures. The Duke of Athol has placed his woodlands at the board's disposal for practical instruction and the aim of the school is both provision of technical instruction and the furnishing of openings for discharged service men.



A Beautiful English Walnut Tree in Washington's Garden, Mt. Vernon.

The Great Washington

probably did not know that an acre (50 trees) of

English Walnut Trees

will produce in a single year food equal to 60,000 eggs (as asserted by Dr. J. H. Kellogg), but he did know the great value of nut trees and planted them around his home at Mt. Vernon. You may not know that at Rochester we have highly developed the

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so that it is available for planting about your home, in your garden and orchard, with the same assurance of success as a planting of Apples, Pears and Peaches, without regard to our cold winters.

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SELL FUEL WOOD BY WEIGHT

WOOD for fuel should be sold by weight instead of by cord measure, for the heating value depends not upon the bulk of the wood but upon its weight, say foresters of the United States Department of Agriculture in Bulletin 753, recently published. A pound of dry wood of one species has about as much heating value as a pound of any other species, but two cords may vary 100 per cent in their value for heating.

It is the custom to sell hardwoods and softwoods at slightly different prices because of differences in heating values. This is only a superficial classification, however, as two species of hardwood may have heating values widely different. Where hardwoods and softwoods are mixed together without regard to the proportion of each, the values may be so different that one man may, for the same money, buy twice as much heating value as another. The shape and size of the sticks may also cause great variation in the actual amount of wood substance, and therefore of fuel. If weight were the measure, the species, shape, and size of sticks would make little difference, provided the wood were thoroughly seasoned. It would be necessary, however, to fix certain standards as to time of seasoning of wood, the specialists say.

The bulletin points out that there is special opportunity for greater use of wood for fuel in New England, New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Missouri, and the Lake States, where there is a rural population of about 20,000,000, which is estimated to use annually 18,000,000 tons of coal. A considerable proportion of these fuel users will find wood available close enough to their own neighborhood to make long freight hauls unnecessary. By turning to wood they will not only conserve the fuel supply and relieve transportation, but are likely to contribute to the prosperity of their own community. For one thing the opportunity to sell wood fuel would tend to encourage the improvement of farm woodlands by proper thinnings.

An increased market for wood fuel should open up good opportunities for operators of thrasher and silo-cutting outfits or others who have gasoline or kerosene engines to do custom sawing during the winter, according to the bulletin.

The bulletin contains many suggestions as to how to develop and handle the woodlot to the best advantage. How to produce wood, how to sell it, and how to use it are all covered in a practical way.

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"LONG Life for Wood at Low Cost" is the name of a valuable booklet which has just been published by the Barrett Company. It treats in a very practical and thorough way of the protection of wood from destruction by decay and insect attack through the application of creosote oil and it tells of the simplicity and ease with which this preservative may now be used.

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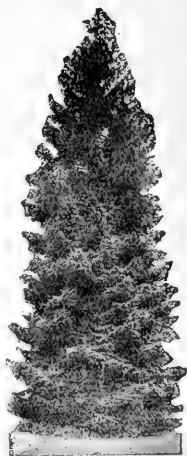
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Some Government War Secrets

—and the reason for the Victory Liberty Loan

WE HAD promised the Allied war-chiefs that we would have in France by July of last year, 600,000 men. On that date we had a little over 1,900,000. We had behind them nearly 2,000,000 in this country under training who would have been on the front before July, 1919, and we had behind those 4,000,000 men as many more men as were necessary to do the job.

"Four million men in France meant at least 20,000,000 tons dead weight of shipping to take care of them, and we had that program under way and were making our maximum output just about the time the armistice was signed. Twenty million tons of shipping at present cost means just about \$4,000,000,000 or a little over.

"Did you know that those 2,000,000 men in France, who did so much to bring the war to an end, had only one small battery of American-made artillery behind them; just one battery of 4.7 and a few big naval rifles! The rest of the artillery used by the American soldiers was made by Frenchmen in France. But, on the way was a great stream of guns and shells that would have blown the German army off the earth. But that stuff had just come into large production in November, 1918. And it is for the deliveries on that big peak production that we have to pay in December and January and will have to continue to pay for in February."

* * *

"Our program for tanks, of which few got into action, was, I have been told, to provide for a tank in 1919 for every 75 feet of the front."

* * *

"Those are some of the things that cost money, and practically none of those great supplies of artillery, of shells or tanks, even of ships, practically none of that stuff was ever used. What an awful waste! We are asked to pay for a dead horse that never drew a load! It is discouraging, paying for something that is no good!

"Well, let's see if it's any good. Do you realize that the German army was never really routed; that except for a little bit of a stretch down in Alsace-

Lorraine it was never fighting on German soil? They were brave soldiers, the German soldiers. They still had millions of them on the Western front. And yet they surrendered while they were on foreign soil. They had a fleet which had required years and years and years to build and it flew the white flag without firing a shot."

* * *

"I cannot believe that these great stores of munitions were wasted. In addition to the bravery of the American doughboy that arrived in France and got into action in numbers about the 15th of July and turned the tide and drove the Germans back, in addition to his bravery and his almost reckless spirit of determination, for which the praise cannot be too high, I say in addition to that, I believe there was one other factor that brought this war to an end at least one year before the most optimistic of us had dared to hope for. One other factor, and that was that Germany, her general staff, knew that back of the few hundred thousand Americans that really got into big action, and back of the 2,000,000 in France, was another 2,000,000 ready; and despite the fact that we had practically no artillery of American make on the Western front, that there was a great stream of American-made artillery on the way. And it is my conviction that the German staff knew that if they prolonged the war into 1919, they were inviting, not certain defeat, but certain annihilation."

* * *

"We are asked to pay for things that were never used; we are asked to pay for shells that never were fired; for cannon that never reached the battlefield, but we are asked to pay for those things that helped in a major way to bring this war to an end in 1918 instead of 1919. And the bringing of this war to an end twelve months before we could logically look for it means that we are asked to pay for saving the lives of 100,000 or 200,000 American boys who would have died on foreign soil had the war continued another year."

—Extracts from a speech by Hon. Lewis B. Franklin,
Director War Loan Organisation, U. S. Treasury Department.



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BY ELLWOOD WILSON

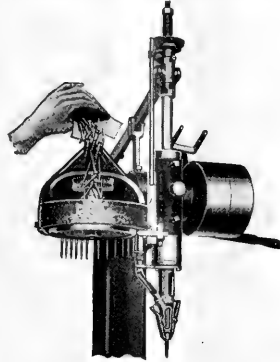
PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE most important event from a forestry standpoint of the past month was the meeting between a committee of the Quebec Limit Holders' Association, some members of the Woodlands Section of the Canadian Pulp and Paper Association and the Hon. Jules Allard, Minister of Lands and Forests. This meeting discussed with the Minister the advisability of planting on government lands held under lease and ways and means of accomplishing reforestation. The consensus of opinion was that reforestation was a pressing necessity and that the government should bear some of the financial burden of such work. The Minister said that he was quite willing to consider any plan which the Committee would bring forward and would, when such scheme had been approved by the Committee and himself, bring down the necessary legislation. Ways and means are now being considered and the Committee will shortly meet to discuss the subject in all its different aspects and decide on what shall be presented to the government. The ravages made by a fungus disease on the balsam are becoming so serious that in a short time the present stand of this species will all be affected and it will not be possible to cut it. As it forms about 60 per cent of our total soft wood stand this will cut the length of time for which we have sufficient wood in two. The only means for combating this disease that seems to be known is to burn the debris from logging and gradually try to clean up the woods. This would have the added advantage of reducing the danger from forest fires and also the cost of fighting them but would increase the cost of the wood.

An active interest in reforestation is being taken by the larger and more progressive paper companies. The Laurentide and Riordon Companies have been planting for some years and this year the Price Brothers Company, The Abitibi Company and the Belgo-Canadian Company are making plans to commence. Such progress is indeed noteworthy and speaks well for the future of our timber supply.

A standardization committee, consisting of the Managers of the co-operative fire protective associations, the Manager of Dominion Parks, a member of the Forester's staff of the Railway Commission and a member of the Dominion Forestry Branch, together with the Foresters of Ontario and New Brunswick, has been formed which will try to correlate and standardize fire protection methods and to develop new and improved means for fighting fires. This is a long step in advance and will certainly bring good results and increased efficiency.

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The Annual Meeting of the Dominion Conservation Commission was held in Ottawa in February and reported progress along forestry lines in all parts of the Dominion. Especially encouraging was the report on the research work completed during the past season and the large program for the coming summer. The Provincial Governments and private firms are co-operating both with financial help and through their forestry personnel. The information being obtained is absolutely basic and is necessary before we can make any intelligent plans for handling our woodlands in the future. Permanent sample plots have been laid out where questions of growth, future yields, insect and fungus injuries, effect of slash disposal methods, reproduction on old burns, and the effect of different methods of cutting are being carefully studied. Plots have also been established for the study of planting under different conditions of soil, number of trees, various associations of species and other important questions. The effect of the drainage of swamp areas on tree growth is also being studied. In one section a permanent camp for the housing of personnel and equipment has been constructed.

Messrs. Robson Black and Ellwood Wilson spoke at the Forestry Conference held in Boston, under the auspices of the Boston Chamber of Commerce, February 24 and 25.

A. C. Volkmar, who has been for some years the Forester of the Riordon Paper Company and has put their forestry department on a splendid basis, has taken a position with the Canada Paper Company. He will have charge of the mapping and estimating of their new limits and will prepare a working plan for their exploitation.

Lieut H. G. Schanche, who left the Laurentide Company to enlist in the avia-

tion section of the U. S. Signal Corps, has been discharged and has again taken up his duties with the Laurentide Company.

Sergeant Arnold Hanssen, of the Canadian Society of Forest Engineers, had a very narrow escape just before the signing of the armistice when a shell splinter or machine gun bullet went through his steel helmet. He has been taking a trip through southern France and Italy and expects to visit his people in Norway before returning to Canada.

There has been a great shortage of timber in South Africa during the war and but for the foresight of the early settlers the situation would have been very serious. It is felt that a vigorous tree planting campaign should be undertaken. The railways have already done some work along this line. They now have 55,504 acres under management, of which 23,532 acres have been planted. The oldest are sixteen years of age and are already yielding marketable timber from which a considerable revenue is obtained.

The Canadian Forestry Association is entering a new year of usefulness with 8,000 members.

A new company, the "Norske Kemikalier" with a capital of half a million dollars, has been formed to produce medicinal and chemical compounds from the destructive distillation of wood. The principal material is fir tree roots.

There is at present some inquiry for Canadian timber lands from England and Norway and some sales have been made.

The International Paper Company which owns some two thousand square miles of timber limits in the St. Maurice Valley, are

Note two trees in this row missing. Compare size and appearance of trees with those at the right, planted in blasted beds—drawn from photograph.



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Row at left in spade-dug holes; at right in blasted beds. Orchard of George W. Brown, Mt. Cory, Ohio.

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FORESTRY FOR BOYS AND GIRLS

(Continued from Page 1007)

trees, but some species are able to stand much more shade than others. Those with a dense, heavy foliage—that is those that make good shade trees—can stand more shade than those with less dense foliage. The sugar maple is a very good example of the former and the ash of the latter.

Consequently, when these two species, the sugar maple and the ash, happen to grow side by side, the light shade of the ash has very little effect on the growth of the sugar maple, while the dense foliage of the sugar maple is almost sure to clean all the limbs off of the near side of the sensitive ash.

QUESTIONS FOR NEXT MONTH

(1) In a dense stand of basswood, maple and hickory, what species of young growth do you find?

(2) What hardwood tree has a bud with a decided hump on the side of it?

WHAT THEY SAY

"I have read with great satisfaction the article by Dr. Shufeldt in *AMERICAN FORESTRY* on budding leaves. The fringe tree especially interested me. Thank you for giving me so much pleasure in these cruel days."—*Dan F. Bradley.*

"We are now furnishing your magazine to one of our Log Camps, and two of the individuals of our company are also subscribers. This is a good magazine and we get a good deal of pleasure from reading it."—*P. R. Caray, Vice-President Camp Manufacturing Company.*

"I have been greatly attracted by your series of articles and the excellent photographic illustrations in *AMERICAN FORESTRY*."—*Homer D. House, August 15, 1918.*

"Let me thank you for having sent to me the copy of *AMERICAN FORESTRY* containing Dr. Shufeldt's charming article on pictures and plants for Christmas. It always does me good to read things like this."—*Waldemar Kaempffert.*

TRAINING COURSES IN WOOD INSPECTION

THE inspection of wood has played a greater part in the manufacture of aircraft than in any other important industry and at the beginning of the war the number of men qualified for this work was very limited. The Forest Products Laboratory at Madison, Wisconsin, prepared a handbook for inspectors and conducted short training courses in wood inspection.

There is a very definite possibility that with the coming of peace similar courses of instruction for representatives of manufacturing plants in the wood using industry will be instituted. A number of manufacturers have expressed a desire to send men to the Laboratory for a short period of training.

about to commence the erection of a large paper mill at Three Rivers, Quebec. It is said that they will spend about six million dollars. This addition to the mills in this valley will make it one of the most important paper producing sections in the country, and will be a great addition to the industries already operating in Three Rivers.

A delegation consisting of Sir William Price, Brig.-Gen. J. B. White, D. S. O., and Ellwood Wilson, with other members still to be announced, went to Ottawa on March 18 to impress upon the government the necessity of using returned soldiers for reforestation work. In the opinion of General White, there is no other work so well suited to those men who have been gassed or shell shocked. He estimates that there are about fifteen hundred such men to be cared for. The Dominion and Provincial Governments have large areas of lands which could be planted and also nurseries from which stock could be supplied.

The general opinion of all those who have observed its results, is that in the

forests of eastern Canada, the diameter limit has been worse than a failure. Its effect has been to take out the best trees and leave all the poor ones. It was always supposed that the smaller trees left would grow and produce a second crop but it has been definitely proved that most of these are suppressed trees which rarely take on any new growth after the removal of the larger ones and then only after some time. If the stand is opened up appreciably almost all of them blow down. The removal of the spruce has encouraged the reproduction of balsam and now that the balsam is being heavily cut the forests are rapidly becoming almost pure hardwood stands. It is hoped that some other method of regulating cutting in our forests will be developed. The Quebec Government already has made arrangements by which a license holder can ask to have a forester examine the land he wishes to cut, and if in the forester's opinion, some other method of cutting than that laid down in the regulations would be better, he may give permission. This is certainly a step in the right direction.

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George W. Barnett, superintendent, Morris, Whitridge estate, Adamsville, Rhode Island, and a view of the famous "Avenue" on the estate which is visited by hundreds of tourists yearly



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FORESTRY IN LOUISIANA

REFORESTATION of Louisiana and conservation of those forests already standing in the state is the purpose of a popular movement which has been inaugurated through the efforts of R. D. Forbes, superintendent of Forestry for Louisiana. An association has been organized, and one of its chief purposes will be the promotion of public sentiment in favor of the utmost co-operation in the prevention and suppression of forest fires.

Mr. Forbes believes that one of the chief causes of waste in lumber building materi-

als is forest fire. The state still has extensive areas of forest, and it is the plan to save as much as possible of them for the uses of industry and the public through an active campaign against forest fires.

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PLANTING TREES IN A NEW WAY

PARK COMMISSIONERS are supposed to be pretty wise in matters pertaining to trees, but the more open-minded among them are constantly learning new wrinkles. The old saying that experience is a great teacher applies in tree lore as well as in many other lines of human endeavor.

Mr. William J. Butler, general manager of the Board of Commissioners of West Park, Joliet, Illinois, a few years ago read in the magazines that dynamite was great stuff to use in preparing holes in which to plant young trees. But he was a conscientious man, and did not feel it would be right to try out experimental ideas in the public park, which was entrusted to his care, so he determined to test it in his own private orchard.

He ordered from a nursery some Early Richmond cherry trees, some Siberian crabs and several other varieties of apples and decided to plant them in blasted soil.

But, realizing the need of something to compare with, in order to see just what the advantages might be of the new method, he induced some of his neighbors to order some of the same stock, from the same nursery, and plant it at the same time, in soil of similar characteristics, in spade-dug holes.

Mr. Butler says the tree holes on his place were blasted with half sticks of dynamite. The neighbors dug their holes in the good, old-fashioned way.

All the trees were two-year-old nursery stock. Three years after planting, Mr. Butler writes:

"My trees are actually twice as large, and look healthier in every way. I had plenty of cherries and crab apples this season, also some other apples, while there was not the sign even of a blossom on the trees planted in the undynamited soil.

Trees on both places have had practically the same care, so I am satisfied in my own mind that the difference in growth is due entirely to the different modes of planting.

"All I knew about dynamite as used in tree planting was what I had read in the magazines, and I was merely experimenting when I planted my trees. But I want to say now that if I had 40 orchards to plant not a tree would be set out that was not in a dynamited hole."

Evidently Joliet citizens residing near West Park may be expecting to be treated to a little display of fireworks the next time any trees are to be set out in the park. If Mr. Butler will do the planting on the 4th of July it will be unnecessary for the boys of that neighborhood to invest any money in firecrackers to fittingly celebrate the glorious day that typifies our independence.

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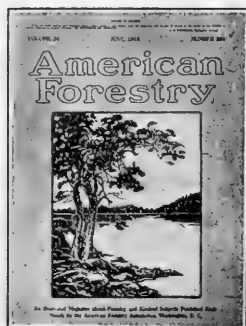
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- IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.
- IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.
- IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.
- IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.
- IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.
- IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes. Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

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THE GREAT HUMANITARIAN NEED, THE PRIME ECONOMIC IMPORTANCE, THE BROAD CONSTRUCTIVE VALUE OF THIS WORK—ALL PLACE IT ON A PLANE WHICH GIVES IT STRIKING PRE-EMINENCE. THEREFORE, IT IS FELT THAT EVERY MEMBER OF THE AMERICAN FORESTRY ASSOCIATION WILL DESIRE TO HAVE A PART, AND AS BIG A PART AS POSSIBLE, IN CARRYING OUT THIS PROGRAM.

BY THOSE WHO ARE COMPETENT TO JUDGE, IT IS ASSERTED THAT THE FORESTS OF FRANCE KEPT THE GERMANS FROM PARIS. HOW GREAT A DEBT, THEN, DOES THE WORLD OWE TO THEM!

AMERICA CAN BUILD NO NOBLER MEMORIAL IN EUROPE THAN BY REPLACING THE DEVASTATED FORESTS OF FRANCE, GREAT BRITAIN, BELGIUM AND ITALY. ANSWER THIS APPEAL AT ONCE BY SENDING YOUR CHECK FOR WHATEVER AMOUNT YOU CAN AFFORD, TO THE AMERICAN FORESTRY ASSOCIATION. IT WILL HELP TO PURCHASE THE SEED NEEDED TO REPLANT THE FORESTS OF OUR ALLIES.

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

MAY 1919 VOL. 25

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THIS BEAUTIFUL SPOT IS ON THE GREEN, AT KENDALL, MASSACHUSETTS, AND SHOWS THE TREATMENT OF A STREAM WHICH HAS PROVED TO BE A VALUABLE ASSET TO THE COMMUNITY. Photograph shown through courtesy of the F. A. Bartlett Company.

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COSTUMES OF STUDENT WORKERS

These young women are part of a class which received several months' training in practical forestry and lumbering before starting actual daily work on timberlands.

A FEATURE OF THE TRAINING OF WOMEN

The instruction received by the women workers fits them for certain kinds of lumber and forestry work in the future and many may take advantage of this.



INSTRUCTION IN FORESTRY

It was found that the class of women volunteering for forestry work learned quickly and became serviceable workers in a few weeks' time.

AMERICAN FORESTRY

VOL. XXV

MAY, 1919

NO. 305

WAR'S DESTRUCTION OF BRITISH FORESTS

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

This is the third of a series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France and Belgium in December, 1918, and January and February, 1919, taken for the purpose of investigating war-time forest losses and of ascertaining how best America can aid in restoring the forests of our Allies.—Editor.

LONDON, February 8, 1919.

THE British navy must have coal. Without coal it is useless. British coal mines must have timber. Without timber they are useless. British forests and woodlands cannot provide all the timber needed for British mines. Therefore Great Britain knew early in the war that unless she could get pit timber, or mine timber as it is called in the United States, from nearby countries she could not keep her mines producing coal and without coal her navy was helpless.

The problem of obtaining pit timber was therefore the most serious forestry problem in Great Britain during the war. She met it by cutting fifty per cent, some 450,000 acres, of her productive timber land for pit timber and other war-time needs and by importation, hampered greatly by the submarine menace, from other countries. Furthermore, she would have cut all the trees in the United Kingdom if it had been possible to transport them to the saw mills. Transportation, due to the fact that every horse and every automobile was requisitioned when war broke out, was not to be had except where saw mills were close to forests and woodlands and this alone resulted in Great Britain having left now about half the forest and woodland

acreage she had when the war started. The need for timber was so great, and the lack of British lumber workers so pronounced that Great Britain speedily realized her deficiencies as a producer of lumber. First she imported Belgian labor. This was not satisfactory. Then she tried Portuguese with better results but she did not make real progress either in labor or machinery until she secured forestry and lumber battalions from Canada and the saw mill unit organized and equipped in New England and sent over to Scotland for eighteen months' work.

Big saw mills were erected by the Canadians and the saw mill units took over portable mills.

These helped wonderfully to supply some portion of the lumber needs and the remainder was imported. One hundred thousand tons of pit timber a month was demanded by the mines. Ultimately Great Britain was able to supply 40,000 tons of this and import from France 60,000 tons. Previous to accomplishing this some pit timber was secured from Sweden by means of a three-cornered agreement between Great Britain, Sweden and Germany.

The British knew the Swedes needed certain commodities that only they could furnish so they said to Sweden,

SEED FOR GREAT BRITAIN

In order to restore her denuded forest lands and to plant waste land Great Britain needs forest tree seed. Douglas fir and Menzies Spruce is desired and as the seed crop in Great Britain is very small the American Forestry Association has secured a fund which will enable it to present a large quantity of the seed needed for re-planting in the British Isles.

AMOUNT OF CUTTING

It is roughly estimated that England, Scotland and Wales, cut about 17,000,000 tons of green timber for war purposes in the three years 1916, 1917 and 1918. This amount is about twenty times the average annual pre-war fellings. This however is only part of loss since the woods had to be slaughtered irrespective of the interests of silviculture in order to keep the collieries and national industries supplied with the necessary timber. This often entailed cutting out suitable sizes for pit-wood and other requirements and ruining the entire future of the woods.

"We will furnish these to you if you send us pit-wood." Sweden replied, "But Germany will not permit our ships to carry pit-wood to England." Said the British, "Tell Germany that you will not supply her with iron ore which she needs, unless she permits you to send us pit timber and you to get in return these supplies you need from us." Sweden made the proposition, Germany adopted it and the three cornered bargain between the two enemies and a neutral was made.

Great Britain was thoroughly in earnest about cutting down every tree if it was needed. Windsor forest, beautiful, historic, thirty miles from London was sacrificed.

for the large developments in munition and other enterprises in Great Britain.

For a few months the authorities in Scotland, where much cutting was being done, endeavored by co-operation with the home timber trade to supplement the supply of sleepers and of trench timber which was required, but this assistance was quite inadequate, and after several conferences in London with the departments interested, it was decided to form the Home Grown Timber Committee which was done in November of 1915.

The Committee was authorized to purchase fabricated timber from the timber trade; purchase woodlands



TIMBER STACKS AT A CANADIAN CAMP

This mill and lumber yard situated in the midst of a good-sized tract of timber land is typical of the way lumber operations were conducted in the British Isles.

A big Canadian saw mill was established in the heart of it and 4,700 of its 7,000 acres were cut. Practically all would have been cut had not the mill burned down when about two-thirds of its work was completed. In and about this forest the writer spent a day as the guest of Mr. M. C. Duchesne, honorary secretary of the Royal English Arboricultural Society and one of the best informed foresters of England.

During 1915 the British Government found that it was becoming increasingly difficult to obtain a sufficient supply of imported timber for the army in France and

from the owners of estates, and carry out independently the exploitation of woodlands on behalf of the Government.

Immediate steps were taken to forward these objects but the Committee was faced with various difficulties—among others, the shortage of labor, and also the provision of plant. The owners of the estates, upon the whole, rose to the position, and with few exceptions willingly afforded the Committee the opportunity of selecting and purchasing their forest ground. The timber trade in Scotland, which was previously fairly well organized,

responded generously, but labor and machinery continued to be a source of anxiety.

For a few months Col. John Southerland acted as executive officer in Scotland and afterwards was asked to transfer to London, and became director of the Committee, with very ample powers. Finding that it was impossible to secure a sufficient number of lumbermen in Great Britain, Lord Selbourne, who was then Minister of Agriculture, approached Lord Kitchener, and as a result the latter cabled to Canada and asked the Dominion Government to provide a battalion of lumbermen. The latter government at once acquiesced, and in the month

end of the year, and added materially to the output.

During the year, the Committee urged the employment of German prisoners of war, and gradually obtained limited supplies of these men for operations. Early in 1917 the Government had to reckon with a further decrease in the shipping available for timber and for other purposes, and as timber occupied a very large share of the tonnage it was decided that operations should be commenced in France, so that as little timber might be carried by sea as possible. In considering this matter it was necessary to remember that Great Britain was dependent upon France for the provision of pit-wood for



CANADIAN OPERATION IN SCOTLAND

A large mill at Knockando, Scotland, erected and operated by a Canadian forestry unit, secured timber from a large area by the use of lumber cables. This photograph shows one cable across the river Spey. The carriage is loaded and the method of operating the cable is clearly indicated.

of June, 1916, the 224th Canadian Forestry Battalion arrived in England, fully equipped with saw mills and tools.

In the meantime the Committee was able to make arrangements for the provision of saw mills and of other plant in Great Britain and Belgian and Portuguese labor was utilized in some of the woods. The Committee was still working under extreme pressure, for the imported supplies were still decreasing, and Lord Kitchener agreed to demand another battalion of lumbermen from Canada. This battalion reached England towards the

the Welsh mines. These mines required about 100,000 tons per month of pit-wood, the greater bulk of which came from the district of Les Landes and Gironde by sea. The Government decided that it was essential that this supply should be decreased if possible by the provision of mine timber at home, and by this time the general supply of timber became critical, and the Government decided that as practically all the wood was required for military purposes the War Office should take control, and they accordingly appointed a Controller of Timber under that department. The Controller of Tim-

ber was authorized to take charge of all operations at home, and to take possession of all the imported timber in the country. He was responsible for the distribution of all supplies, and was given the right to fix prices.

By this process the Home Grown Timber Committee was absorbed into the Timber Control. At that time the Timber Committee had altogether in operation 135 different exploitations in Great Britain, as also 25 exploitations by the two Canadian Forestry Battalions. The development during this period of the supply of pit-wood was such that the imports from France were reduced by 20,000 tons per month.

The War Office and the Controller of Timber in the meantime applied for further assistance from Canada, but these men were really asked for with a view of their being transferred to France. Up till this time it was not possible to commandeer forests, and as encroachments upon them were becoming somewhat serious, and as time was of consequence, the Government authorized the Controller to take such forests as he was advised to select, and the owners were paid, failing mutual agreement, the value of them as fixed by an independent commission. At the end of about three months the Control of Timber was transferred from the War Office to the Board of Trade, and various alterations and improvements were arranged in the administration.

Meantime German prisoners and further Canadian lumbermen were enlisted in the work, and at the date of the armistice England had purchased about 175,000 acres and Scotland about 125,000 acres of timber land.

In addition to the above there was a considerable area of wood cut in the first year of the war, of which no accurate record can be obtained, and altogether probably about 400,000 or 450,000 acres have been felled in consequence of the war.

sequence of the war.

As to production during the period, the departments concerned apparently have produced about 18 million cubic feet of timber, and the Board about 280 million cubic feet.

A statement of the labor employed at the date of the armistice by the Timber Supply Department in England, Wales and Scotland, is as follows: British subjects, men, 7,717; women, 1,734; Canadians, 6,686; German prisoners of war, 3,486; Portuguese, 1,926; Newfoundlanders, 541; Finns, 618; Danes, 391; other nationalities, 25; making a total of 23,124.

A. P. Long, Divisional Forester for

the three South Eastern Counties of England, says of the production for war purposes: "We were subject at all times to particularly heavy demands as the conditions at the front called for, and as an instance I may mention that early in 1918 owing to an exceptional call there were despatched from this Division no fewer than



A STAND OF LARCH

This larch at Birnam Hill, Dunkeld, Scotland, is at an elevation of 350 feet. Much of the felling was of stands similar to this.

68 trucks of sawn timber per day to France alone for a period of six weeks or more, other Divisions also sending their share.

"The figures for pit-wood, barbed wire pickets, defence poles and telegraph poles and other round timber are not available on account of the difficulty in collating the different classes of material and the different systems of returns throughout the country. But it may be said that the production also was increased enormously so that, in spite of the severe restriction of imports, the country generally, including the timber merchants, kept abreast of the requirements.

"Some idea of the extent of this section of the work may be gained from the fact that in one week the South Wales Division railed no less than 8,000 tons of pit-wood direct from the woods.

"I should say that in round timber our principal demand was for pickets and defence poles owing to the fact that the South East of England was one huge armed camp and their requirements were enormous as

well as those for France. In the output of this class of material this Division also supplied its fair share, as you may gather from the fact that last spring we were called upon to supply 560,000 pickets in two months and this was about one-half of one huge order."

WHAT THE WAR HAS TAUGHT

The Earl of Selborne, an authority on forestry, made this very frank statement, "There is no country in which forestry has been more neglected than it has in the British Isles. Now the experience of the war has brought home at last, even to the Government of this country, the immense importance of forestry. We were dependent before the war upon imported timber to an

enormous proportion of our annual requirement, not only for all building purposes, but for all pit-props in our mines, and, as every owner of woodlands knows, we who own woodlands found it very difficult to sell our product, however good in quality, for any reasonable price before the war. Now, suddenly in the war, the Government discovered that it is a very dangerous thing to be dependent upon overseas supplies. The shipping problem early became acute, and it was soon seen that a very large proportion of our tonnage was engaged in bringing timber to this country—timber for building, timber for mines, and timber for paper making.

Very early they had to begin to curtail the supply of tonnage used for this purpose; they began to look about and see what there was in the British Isles that could be used. They found a great deal more than anybody believed existed here, and almost all of it has been found to be of high quality, to be wholly suit-



A TYPICAL STAND OF SCOTCH PINE

This timber situated near Orton in Morayshire, Scotland, indicates the size and the character of the stands felled by imported lumbermen operating in Scotland.

able for construction purposes and for pit-props, and you will remember before the war the timber trade was constantly telling us that our products were not equal to foreign goods for those purposes. It was not true, we didn't believe it to be true at the time, and the experience of the war has shown that it is not true; and although, of course, a great deal of the timber that has been cut has been used green and unseasoned, owing to the haste with which its utilization has been required, yet it has been proved to be of fine quality. It is no exaggeration to say that if it had not been for what landowners of this country have done in the way of planting in past years, not only without any encouragement from the Government, but in the face of great discouragement of every kind, this country could not have carried on the war.

"Now, what is the position after the war? Practically we may say that the supply of coniferous timber is exhausted. Everything that could be possibly utilized in the way of coniferous timber will be utilized, before the period of a normal supply of shipping for imports after the war has been restored. There will be no coniferous timber in this country, except very young plantations, and comparatively few of them. There will have been great inroads made upon our ash, the supply of oak will not have been very materially impaired, but such trees as poplars and certain classes of elm will have been largely cut into, and the *problem of reafforestation will at once become acute.*

"If we were caught—which God forbid—in any war of this magnitude thirty years hence, and there had been no replanting on a sufficient scale, the country would be in a very bad position from the very beginning. So far as we can foresee, it would be impossible to keep our mines going on imported pit-props. Therefore, as a mere measure of national safety, apart altogether from the

importance of the forestry industry in any civilized country, it has certainly become necessary for the Government itself to become the owners of forests, and the planter of forests, and to establish a Forest Authority which would own millions of acres, and, gradually, under a proper and well-thought-out system of rotation, establish forests on the French or German model."

HISTORY OF BRITISH FORESTS

In order to obtain a clear idea of the condition of forestry in the United Kingdom at the outbreak of the war it is necessary to know something of its history during the last century, for it was chiefly within that period that the woods felled during the war were planted and tended. From the middle ages onwards the State attempted to

promote the cultivation of timber by legislative methods, but contrary to the custom on the continent of Europe, a very small proportion (less than 3 per cent) of the area of woods in Great Britain remained under State control. The pre-war condition of British woods was therefore the result of the action of economic and social forces on which the State has had little direct influence. It had been profoundly affected by the fact that



British Official Photograph

BRITISH OPERATION IN A FRENCH FOREST

Some sixty thousand tons of pit-wood were cut by the British in the French forests and were shipped to England for use in the mines. The photograph shows a member of a South African labor unit.

unlimited supplies of cheap imported timber were available during the greater part of the 19th century, while the steady rise in prices which marked its close had, when war broke out, only begun to affect the management of British woods.

Both English and Irish private woods of the early 19th century consisted mainly of hardwoods, remnants of the once extensive indigenous forests. In Scotland only were parts of the indigenous forests coniferous, but by the beginning of the last century they had been reduced to an inconsiderable area. Private woods supplied the greater part of the material required for rural and gen-

eral purposes, and owing to the demand for small wood and for oak bark for tanning purposes coppice woods were highly remunerative. It would appear that a considerable revival of interest in forestry, probably more from an aesthetic than a practical standpoint, took place towards the end of the 18th century and continued until the middle of the 19th century.

Towards the end of the 18th century the growing shortage of Navy timber led for a time to an active planting programme by the Crown. It was then determined to plant with oak an area of about 100,000 acres, sufficient to meet the estimated requirements of the Navy. The work was entrusted to the Commissioners of Woods and Forests, who were to find land for the purpose chiefly in



COL. JOHN SUTHERLAND, B. F. C.

British member of the Comité Interallié des Bois de Guerre, stationed at Paris to represent the British Forestry Corps.

the ancient Royal Forests. In 1823 the Commissioners were able to report that nearly 52,000 acres were under timber, but although some planting and replanting went on steadily, the total area had not increased by 1848. A revival of planting took place in the New Forest for a few years after the Deer Removal Act of 1851, but thereafter, as interest in wooden ships declined, interest in the Crown woods declined also, and when forestry again began to receive public attention, about 1880, the importance of Navy timber had disappeared completely. In its place, questions bearing on the more profitable management of the Crown woods, the utilization of waste land and the production of coniferous timber became prominent. The operations of the earlier



British Official Photograph

BRITISH FORESTRY CAMP IN FRANCE

This camp and mill combined is typical of British forestry operations on the western front in France while the character of the French forests leased and cut by the troops is indicated by the forest on the ridge.

part of last century have borne good fruits, for although the Crown woods were formerly managed chiefly with a view to producing hardwoods, and the more recent coniferous plantations are not old enough to yield merchantable timber, there have been set aside, in the New Forest and Windsor woods alone, since the outbreak of war, and are felled or in process of felling some three and a half million cubic feet of large coniferous timber and approximately one hundred thousand tons of pit-wood.

FUTURE FOREST ACTIVITY

Great as has been the sacrifice of forests and woodlands by Great Britain it has not been in vain for knowledge of her weakness in timber resources forced upon her by the war has led to a movement that assures more forest activity in the future than she has ever experi-

United Kingdom having regard to the experience gained during the war.

In view of the fact that a national lumber and forest policy for the United States is now being earnestly advocated it is well worth noting that this British forestry reconstruction committee in its report to Parliament states that the British forest policy has been totally inadequate; that dependence on imported timber is a grave source of weakness in war; that the supplies of timber even in times of peace, are precarious and lie too much outside the Empire. These conclusions, the committee states, are not only the best reasons for extensive planting but afforestation would increase the productiveness and population of large areas of the British Isles which are now little better than waste.

The committee presents a summary of its main con-



British Official Photograph

CHARCOAL FOR THE BRITISH TRENCHES

The charcoal made in the French forests leased by the British were packed in bags by Indian labor troops and sent to the front on the narrow gauge railways so generally used by the armies for transportation

enced in the past. Plans have already been made and are rapidly nearing completion, for the reforestation of her cut over areas and for the planting of great areas of waste land suitable for nothing except the growing of timber. A committee of distinguished men, after a careful survey of the situation, has submitted to Parliament a report and recommendations which undoubtedly will be the basis of the future forestry program in the British Isles. This committee was commissioned to consider and report upon the best means of conserving and developing the woodland and forestry resources of the

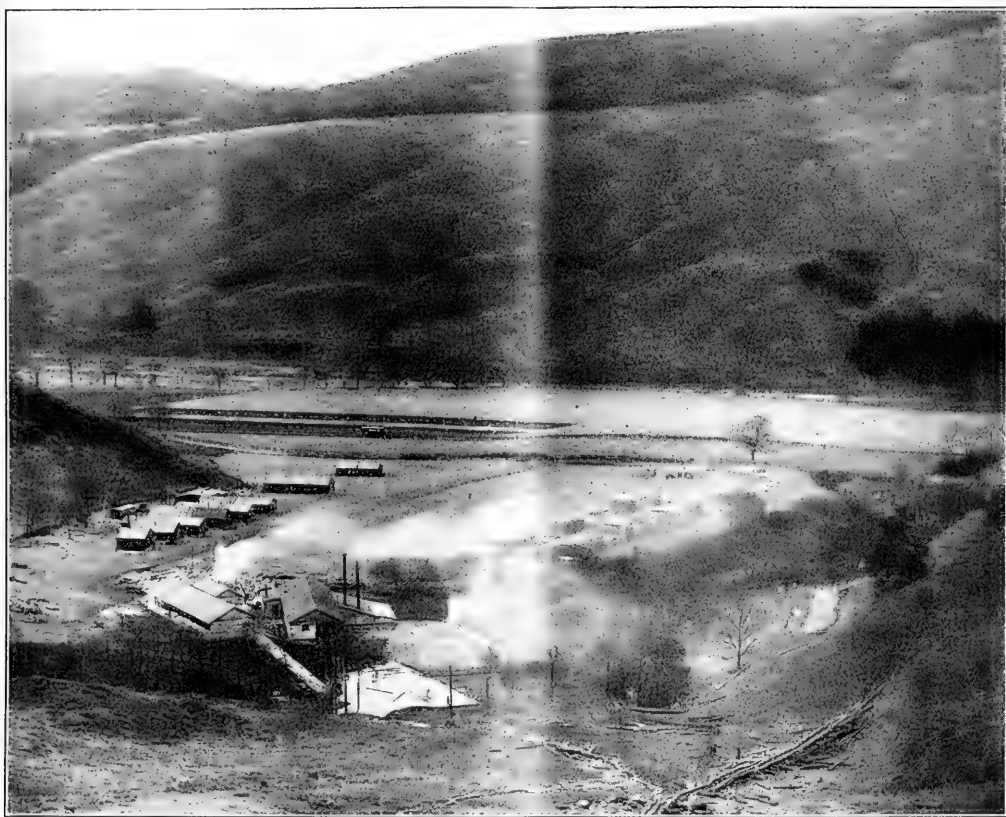
clusions upon the forestry situation in Great Britain by saying:

(1) The total area under woodland in the United Kingdom before the war was estimated at three million acres, the annual yield from which is believed to have been forty-five million cubic feet, or about one-third of what it should have been under correct silvicultural management. These figures indicate the unsatisfactory condition of British and Irish woods as at present managed, and prove the urgency of remedial measures in the interests of national economy.

(2) During the five years preceding the war the average annual imports of timber similar in character to that produced in the British Isles were equivalent to five hundred and fifty million cubic feet of standing timber. The home production was therefore less than eight per cent of the consumption. The imports of timbers of all kinds during the years 1915 and 1916 were respectively three-quarters and two-thirds of the normal pre-war imports, and their cost for the two years was seventy-four million

(4) Dependence on imported timber has proved a serious handicap in the conduct of the war. The United Kingdom cannot run the risk of future wars without safe-guarding its supplies of timber as every other Power that counts has already done.

(5) In order to render the United Kingdom independent of imported timber for three years in an emergency, it is necessary, while making due allowance for an improved yield from existing woods, to afforest 1,770,000



A MILL OPERATED BY NEWFOUNDLANDERS

This mill and encampment at Craigoinean, Dunkeld, Scotland was a goal-sized operation, the extent of which is plainly shown by the photograph taken from the hill overlooking the mill.

pounds, or thirty-seven millions in excess of their pre-war value. These imports absorbed seven million net tons of shipping, equivalent to approximately fourteen million tons dead weight.

(3) The area of land utilized for rough grazing, but capable of growing first-class coniferous timber of the same character as that imported, is not less than three and probably more than five million acres. Two million acres could be devoted to timber production without decreasing the home production of meat by more than 0.7 per cent, and if so used would ultimately afford employment to at least ten times the number of men now engaged on that area.

acres. Taking 80 years as the average rotation, we advise that two-thirds of the whole should be planted in the first 40 years. We consider that the quota to be planted in the first 10 years should, in view of the initial difficulties, be limited to 200,000 acres, of which we advise 150,000 acres should be planted by the State and 50,000 acres by public bodies and private individuals assisted by grants, or by co-operation between them and the State. The area to be planted by the State in subsequent years may be reduced in the same degree as private individuals come forward to undertake the work.

(6) It is not proposed to plant arable land, but a limited area of arable land should be acquired with the

forest sites wherever possible in order to provide small holdings for forest workers. Our proposals carry with them the important contingent advantage that they will cause large areas of the United Kingdom, now almost waste, to be put to their best economic use. They will also, if provision is made in time, afford the means for settling discharged soldiers on the land under healthy conditions.

(7) Forestry demands long views, but the first fruits are not so long delayed as many imagine. The policy of

The care of forestry, now divided among several departments, should be centralized in this body.

(9) We recommend that the Authority should be authorized to make limited grants for every acre replanted or newly afforested during the first 10 years after the war by public bodies or private individuals; such plantations to be made in accordance with approved plans and conditions.

(10) We estimate the cost for the first 10 years at £3,425,000. It may be necessary to invest £15,000,000



British Official Photograph

CHARCOAL KILNS NEAR THE BRITISH FRONT IN FRANCE

British soldiers attached to the forestry division making charcoal in one of the forests leased from France. This charcoal was used for warming the troops in the trenches.

State afforestation which we recommend will begin to provide pit-wood, from the quicker-growing species on the better kinds of mountain land, from the 15th year onwards; by the 40th year the plantations made in the first ten years alone will contain sufficient timber to keep our pits supplied, in emergency, for two years on the scale of present consumption.

(8) The first essential is a Forest Authority equipped with funds and powers to survey, purchase, lease and plant land and generally to administer the areas acquired, with compulsory powers to be exercised, when needed, after due enquiry and the award of fair compensation.

altogether in this enterprise during the first 40 years. After that time the scheme should be self-supporting. The financial return depends on prices, wages, bank rates, etc., which are difficult to forecast. Forests are a national necessity; the country must have them even though they yield less than the current rate of interest on the capital invested. The whole sum involved is less than half the direct loss incurred during the years 1915 and 1916 through dependence on imported timber.

(11) The above proposals are framed in the interest of national safety, which requires that more timber should be grown in the British Isles. There remains a further

question. The United Kingdom derives more than half its imported timber from virgin forests in foreign countries, which are steadily being depleted. Canada contains the only large reserves within the Empire. Unless arrangements can be made with the Dominion Government for the effectual conservation of these reserves, it is inevitable that provision should be made within the British Isles on a far larger scale than is here proposed for the purposes of defence. We consider that this

British Isles, but also to set in motion the machinery for carrying it into effect.

"Thirdly, to constitute a body who can view the forestry situation in Great Britain as a whole, and decide on purely forestal grounds the conflicting claims of the various countries unbiased by local or political pressure.

"Fourthly, to constitute a body who, in time of war, could act with the Military Authorities to exploit both State and private forests for the benefit of the country.



British Official Photograph

BRITISH FORESTRY SOLDIERS CUTTING WOOD IN FRANCE

The British Army needed quantities of lumber for barracks, trenches, dugouts and other military uses and several companies of lumbermen were kept busy supplying these needs by cuttings in forests leased from the French.

question should be taken up at once with the Dominion Government."

NEED OF A SINGLE AUTHORITY

General Lord Lovat, in command of the British Forestry Regiments and a member of the Forestry Reconstruction Committee, in speaking of the future development of forestry in the British Isles emphasizes the importance of a single forestry authority having complete charge of the work which it is planned to do.

Lord Lovat very frankly says the creation of a single forest authority is required:

"Firstly, and principally, to make a definite break with the past, to get out of the welter of conflicting authorities and to escape from the arena of party politics, Royal Commissions and amateur inquiries.

"Secondly, to make it possible for an accredited authority not only to draw up a definite forestry policy for the

He adds, "the first three points have been dealt with in the report of the Committee. It is only necessary to say about the fourth point that in France at the beginning of the war a central Forestry Authority existed, the resources of each forest were known; the transport facilities, railway sidings and light railways had all been studied in times of peace, with the result that the maximum of production was possible with the minimum of effort.

"Forest utilization in England at the beginning of the war presented a very different picture. It was twelve months before the Government improvised machinery to deal with the subject. By this time many of the skilled men had already enlisted. Mills were to be found without men, men were to be found without mills. Forest workers were badged and de-badged at uncertain intervals. Departments competed for labor, while German

prisoners, skilled in forest work, were unemployed for months, and, after their employment, tied down with such regulations as to make their work relatively unproductive.

"Even the responsibility for the organization on timber production was never vested in one authority for many

"It is difficult to see why Great Britain, who has her State forests and forest policy still to create, should be an exception to this generally recognized rule. It is certainly not on the experiences of the past that she can base any claim to be an exception from the methods that have been found to be necessary elsewhere."

WOMEN WORKERS IN FORESTS

The lack of labor made it necessary to employ a number of women in forestry work. The women so placed were drafted from the working classes, and they had not undergone any course of training preparatory to their taking up employment in forestry. Many of them were



A REAL HUSKY CHOPPER

After instruction and practice women were able to fell timber quickly and cleverly. This young woman was a particularly capable wielder of the ax.

consecutive months, but changed from the Board of Agriculture to the Office of Works, from the Office of Works to the War Office, and from the War Office to the Board of Trade. The fault for all this is to be found in lack of organization before the war. Nothing had been thought out, no authoritative body existed in whom the public had confidence. It was impossible to execute a survey of timber resources and build up an organization once the war had begun.

"It is not, however, with the past but with the future that the nation is concerned. How to make a forest policy, how to carry it out, and, if the occasion arises, use the resources that the State has built up for the State's best advantage.

"Both in precept and practice the countries of Europe, the teachings of all recognized authorities and the findings of the principal arboricultural societies, not only in Great Britain but elsewhere, have agreed that a forest authority is a necessary part of State afforestation.



COSTUMES OF WOMEN WORKERS

This sensible costume of shirt, trousers, puttees and heavy shoes was found most suitable for the women workers in the woods.

unemployed women, who were idle because of slackness in certain industries, fishing, spinning, mills, etc.

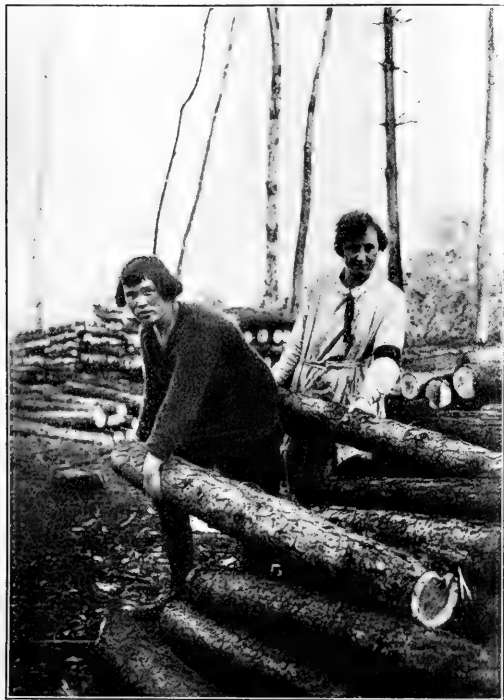
Mr. G. P. Gordon, in reporting on the results of this action, says: "Experience of working squads of these women proved that this type of worker without training is not altogether suited for rural work on the land. Although in many cases good individuals and good squads were encountered, the average individual was too unsettled to obtain the maximum value from her work. It is thought that women of this class, for true economy, must be constantly in touch with their own homes, as they were found to be less adaptable than more intelligent

and better educated women. Further, it was found that the supervision of this class of worker was somewhat costly, as initiative so necessary in land work was almost entirely lacking.

"A problem which had a considerable influence on the efficiency of these workers was the question of dress. It was found that ordinary foot wear was quite unsuitable, and experiments were made with clogs, high boots, leggings, etc., and finally it was decided that stout boots and leggings were the most useful. The ordinary apparel

for them, they were not able to purchase food in a thrifty manner, and therefore had to suffer many discomforts. Probably as a result of this the women were difficult to control, and were somewhat unreliable as regards time-keeping.

"A certain allowance must of course be made, due to



STRENGTH REQUIRED FOR THIS LABOR

It was found that women could stand harder work than was anticipated and it is apparent the labor was far from light.

of the women was found to be unsuited for wet weather, and experiments were made with waterproof skirts, which were not, however, found to be very successful. In nursery work skirts are always a drawback, as they damage young plants in the nursery lines, and also break down the edges of seed beds. In addition, in wet undergrowth they are a decided hindrance to freedom of action. For outdoor land work it is essential that women have the equivalent of a man's jacket, which can be donned during a shower and cast off in hot weather or for strenuous work.

"The question of housing this type of woman away from her home was one which was attended with many and varied difficulties. In the first instance comparatively few of the women were able to do for themselves properly. Further, although they had their food prepared



MEASURING THE FELLED TREE

The women workers were able not only to fell a tree but also to report on the amount of lumber to be secured from it.

the fact that the work and the conditions of labor were entirely new to the women, most of whom were unacquainted with outdoor work and rural conditions generally.

"The experience gained during the years 1915 and 1916 forced one to the conclusion that this class of untrained labor was not the most efficient for the purpose in view. An attempt was therefore made to partially train the women to at least a knowledge of out-door conditions. In this connection the West of Scotland College of Agriculture organized at Kilmarnock in 1917, a scheme for this purpose. The women went into residence at the College farm for a few weeks, and were thereafter drafted to forestry work on different estates throughout Scotland. There was no attempt made to train the women technically in forestry work, but they obtained an opportunity of experiencing land conditions. It was found that the type of women willing to undergo this period of probation was a more intelligent one than those form-



SHE FACED THE CAMERA

Nevertheless she was no fanciful worker but able to do her share of a day's labor in a highly efficient manner.

erly dealt with. In addition she was more adaptable, more reliable, and gave better satisfaction to her employer. These women were drafted to various kinds of forestry work, *e. g.*, seed collection, forest nursery work, planting work, draining, bark peeling, timber felling, brushwood burning, and bracken cutting.

"Although the period of instruction is too short almost to warrant the term training being used, reports from the employers of these women show that the scheme has been more than justified. Their work has included draining, planting, fencing, nursery work of all kinds, felling timber, 'snedding' and cross-cutting timber, measuring timber, and saw mill work. Further, they have engaged in general estate work, bark-peeling, bracken cutting, clearing up and burning brushwood. During hay time and harvest they have been drafted to this work, which has the advantage of giving that variety which experience shows is so necessary in women's work on the land.

"The effect on the women of this kind of work, has been noticed, and in no case has it been found to be detrimental. They have all been able for the work undertaken, and have quickly become fairly expert at it. Their health has, in all cases, materially improved with the out-door occupation, and this has been so even in cases where they have been employed all winter."

STRATEGIC IMPORTANCE OF FORESTS IN THE WAR

BY J. DEMORLAINE

Translated by Samuel T. Dana, U. S. Forest Service, from *Revue des Eaux et Forêts*, Paris, France, February, 1919, and revised to date by Percival S. Ridsdale, Editor of AMERICAN FORESTRY.

"WOODS are an ornament in peace and a fortification in war," wrote Cicero two thousand years ago. Was he thinking at the time of the barbarian invasions which menaced the Roman world and which the destruction of the forests of Gaul by the legions of Caesar succeeded only momentarily in arresting? Certainly in uttering this aphorism, eternally true and now more than ever justified, the prince of Latin orators could not foresee the war in which we have been engaged for more than four years, and in which the woods and forests of France have perhaps played as vital a role as our cannon. It is to wood—wood in all its forms, utilized behind, within, and in front of our trenches—that we owed our ability, in spite of inferior numbers, to hold in check the barbarian hordes invading our native soil.

No one could have anticipated that modern war—prepared for, in fact, as a war wholly of movement—would have become for long months a war of position, transforming our front, from the North to the East, into a vast entrenched camp, and demanding wood in the most diverse forms, from entanglement stakes or telephone

pole cross-arms, to timbers buried several feet below ground,—from the smallest coppice pole to the most majestic veteran of the forest. Our French forests were fortunately very rich. Thanks to the conservative foresight of our foresters since the organization of the present conscientious and devoted forest administration, they have been able to satisfy all needs in spite of the important and more and more numerous demands of the army.

While this is not the chief role which foresters and military men had believed the forests would play if war, always menacing, should unchain its ravages on our country, can anyone say that they have failed to measure up to all the expectations which the facts of history, classic through repetition since the most remote times, might arouse? By no means; our woods and our forests have not only given us unreservedly of their riches to enable us to hold our own against the invader, but they have also played a no less glorious part in the episodes of this unforgettable war, which will unquestionably remain the most terrible and most monstrous war of modern times.

In the days now far distant when we sat on the benches of the Forestry School at Nancy, our comrades will recall that we were taught that our woods and forests would play a dual role in war. In proportion to their extent they could have, on the one hand, a tactical influence as points of support in particular corners of the field of battle, while on the other hand, when affording a continuance screen, they could play a most important and valuable part as a mask for widespread movements and for important maneuvers of large masses of troops.

It is considerations of this sort that for four years we have expounded to our pupils at the National Institute of Agronomy. How many of them have been able to verify in person the truth of these theories; how many have unhappily wet with their blood the soil of a wood

our men who fought to the death under the shade of these unfortunate woods—which are now themselves gone and for so long a time—appreciated too well their tactical value!

Can we minimize the strategic value of our more continuous forests, any more than we can deny that the smaller patches, often only a few hundred acres in extent and without a name until baptized with some title suggested by their shape—"square," "triangular," "star-shaped woods"—have played a truly military role in the defense of our front? Let no one be so deceived. Our great French forests, from the Vosges to the sea, have often stripped the invader of his offensive powers.

In 1914 the German armies of the East are held up on the crest of the Vosges from Mulhouse to the forests of



Photograph by Underwood and Underwood

NORTHERN FRANCE—A BATTLE-SCARRED AREA, AS IT APPEARS TODAY

A scene at sunset on the National Road between Soissons and Chavignis, at one time the very center in the turmoil of battle. These skeletons—mute and pathetic witnesses—are all that remain of the once magnificent avenue of trees which lined the road.

the tactical importance of which they fully understood, and which it had been their mission to defend at any price?

This conception of the military role of forests, based as it is upon the numerous and exact data of history, should not and can not be minimized when we consider this latest war. Is it necessary to recall the names, forever celebrated, of the woods of le Pretre, of la Grurie, and of Mortemart, where thousands of our soldiers were cut to pieces by shells in defending the approach against the repeated attacks of the infamous Boche? Those of

Parroy before Luneville. The great forests of Alsace, of the Vosges, and of Lorraine permitted us to regroup our forces. Epinal was saved. At the same time the defense of the Grand Couronne of Nancy succeeded in supporting itself in the important forests of Champenoux and of the plateau of Hays.

When, after having jumped the defiles of the Islettes and of the Chalade in the Argonne, the victorious hordes tried to menace our lines of communication in the rear while themselves advancing on the Marne, it was again the great forests of Trois-Fontaines, in front of Saint-

Dizier, which saved this important nucleus of roads and railways and enabled us to prevent the Boche from reaching the Marne from above Vitry-le-Francois.

To the west the army of von Kluck, seeking to isolate the bulk of the French army in front of the capital and thinking to enter Paris without striking a blow, appeared to forget the dense defensive screen constituted by the forests of Villers-Cotterets and of Compiègne. Thanks to this the army of Manoury accomplished its rapid movement and fell upon the left flank of the German army. Paris, one can say without exaggeration, was saved the first time by its forests.

It is thanks to these again in July, 1918, that Marshal Foch, supporting himself on the projections of the forest of Villers-Cotterets and of Compiègne worked out the offensive that later developed into the brilliant victory that we admire today, and that gave our arms the decision in this unforgettable campaign. The great forests of Retz (Villers-Cotterets) and Guise (Compiègne)—advanced bastions in the defense of the entrenched camp of Paris

If we look at things from the point of view of the enemy, we see that the important forests of Saint-Gobain permitted him to retard the victorious advance of our troops and to defend the important stronghold of Laon, which made a deeper and deeper pocket in our steadily advancing line. In front of Mangin's army the German retreat was favored by the wooded nature of the country which is covered by a dense screen of forest. The movement of transportable material and of enemy units was well protected by the shade of our forests, behind which the Boche found a protective shelter. And if one stops to look at the map, without which one may easily go astray, he will find between the Sambre and the Moselle the immense screen of forests which succeeded in 1914 in masking the concentration of the 3rd, 4th, and 5th German armies.

According to General Mallerterre: "North of the Oise, the Serre, and the Aisne, the forests of Mormal, Nouvion, Richeval, Signy Mazarin, Saint-Pierre Mont, and Dieulet, the woods of the northern Argonne to the north of



A WOODED SECTION OF THE BRITISH FRONT IN FLANDERS

Here is a photograph which shows the effect of sustained shell fire on a section of wooded country. It shows British troops advancing over newly captured ground from which the Huns have been driven by artillery fire.

—permitted the Generalissimo and his lieutenants to mass fresh divisions and important groups of artillery out of sight of the enemy's aviators. The latter sought to jump the gap at Soissons between Compiègne and Villers-Cotterets. From the forests of Compiègne, of Pierrefonds, and of Villers-Cotterets our counter attacks issued in force, consciously supported by artillery well secreted from all indiscreet reconnaissance. Paris was saved again! The capital may well be grateful to the forests that surround it.

Grandpre, then to the east of the Meuse the forest of Woevre, the woods of Damvillers and the forest of Moyeuivre, surrounding Briey, form an almost continuous cover on the accentuated hills. The great wooded region of the Ardennes shows itself in the north, between the Sambre and the Meuse, as an extended mass of sombre woods—the forests of Trelon and Saint Michel. East of the Meuse the forests spreads out indefinitely over the vast plateau of the Ardennes up to Moselle. Mons, Maubeuge, Mezieres, Sedan, Montmedy, Longwy,

and Briey mark the vast and undulating line of forest in Belgium and France."

It is in this great zone, and under the protection of the immense forests of our northern frontier, that Ludendorff tried to direct the retreat of his armies when once forced to abandon the forest of Saint Gobain, the central bulwark of the Hindenburg line. As was foreseen, the forests of the Ardennes offered to Ludendorff a favorable ground for the establishment of a new center of re-

time, the forests have played a glorious and momentous part in the campaign.

This should not be forgotten when we now think of repairing the immense disasters and the bleeding wounds suffered by these majestic forests. As evidence of our gratitude for the part the forests have played, let us leave to nature, intelligently aided by the work of foresters, the task of patiently reconstructing them. Nature is a good mother; she knows how to do things quickly



FOREST DESTRUCTION ALONG THE FIGHTING LINE

This before the war was a well wooded ridge, the famous Messines Ridge from which the British drove the Boche by terrific shell fire. The photograph shows what is left of the trees after the several tornadoes of shell, machine gun and rifle fire which swept over the ridge.

sistance around which the German right wing could pivot. The resumption of our offensive in the north surprised him. Von Hutier received the order to vacate the pocket of the Laon and to abandon the precious support of the forest of St. Gobain. He concentrated all his forces on the plateau which follows the canal from the Oise to the Sambre, supporting himself in the rear on the forests of Mormal and the Nouvion,—that immense green block which the map shows us to the north of the Cateau. The forest of Mormal, more than 9 miles long and about 6 miles deep, constituted for the enemy a point of solid support and a formidable obstacle to the advance of the Allied armies. It was necessary to make the Boche evacuate this dangerous obstacle by well planned turning movements. The British thought that this would be too long a piece of work, and audaciously resolved to force the issue. The army of Rawlinson turned at the same time the powerful defense formed by the forest of Andigny, which the troops of the army of Debeney occupied. On November 4 the great green block on which the Boche had counted to retard our offensive fell into our hands. Far from disproving the strategic importance of the forests, these facts confirm it. Only the heroism of our poilus kept it from being of great and prolonged value to the enemy.

What more powerful demonstration could be wished of the strategic importance of forests in war? Appreciated in time of peace by the tourist and the hunter, who find in their charming walks an easy and agreeable pas-

sance and well. Let us assist, not hinder her, in her work.

It is not necessary to ask these forests—already bled white, to furnish wood of every nature for our front lines, torn by shot, often devastated thoughtlessly by troops—to furnish in increased quantity the necessary materials for the reconstruction of our liberated regions. The Boche must pay back in kind the wood which he has forced us to spend without stint in opposing the fury of the invader. Our French forests, and particularly our beautiful forests of Ile-de-France, ought to enjoy a long and well merited rest from the devastating ax and, above all, let us not give aid to their enemies by allowing the hunting of game, which the war has stopped. The natural balance in the animal life of the forest has been re-established by the war itself. Let us not favor the return of the rodent under the pretext of restoring hunting, often so harmful to the regeneration of our high forests. These massive stands, after the long and hard campaign, need a long and well earned rest! They have had their long months of suffering; let us leave them to refresh themselves in perfect peace. By their strategic importance, which our great military chiefs have not forgotten, they have saved France. In return let us permit them to recover themselves. Failure to aid them in healing their numerous and glorious wounds would be not only a crime of treason against the country, it would show how poorly we understand the real interests of the nation.

"In the depth of the wood the country has its heart." This should never be forgotten.

Spring In Maryland



*The valleys call to the mountain tops and the
mountains to the plain,*

*The east wind whispers to the Bay and Kent
hears the refrain.*

*The whip-poor-will lends a mystic thrill to the
chanting of the marsh,*

*And the lonely loon stills the insects' croon with
a summons loud and harsh.*

*The tang of the Severn calls to the rose and the
Bluebird hears the cry;*

*In Talbot's lanes the cardinal sings, and is an-
swered from the sky.*

*A magic dew wakes the lilac, too; the daffodil
answers the thrush;*

*The burnished moon sets the swamps in tune, till
the willows bid them hush.*

*And the shattered dreams of the winter are
soothed in the cedar's balm;*

*The blue sky beams on a fairy land, and reflects
the Chesapeake's calm.*

*The sky and flowers of Nature's bowers, the hills
and the eastern strand,*

*The birds, the sun, and Man as one, greet the
spring in Maryland.*

—By John Ferguson.

MONUMENTS WITH A MEANING

THE American doughboy had an important share in making over the map of Europe. Now, but in a different way, he is making over his own country. This is coming about through the memorial plans which are being worked out in hundreds of places throughout the United States.

The memorials of this war are not going to be the "meaningless mausoleums and monuments" which the late Colonel Roosevelt one time condemned; but they will in most instances typify the service and the sacrifice which the nation's fighters endured in order that others might

their soldier and sailor dead, or to those who offered their services. It is combined in park and city beautification systems, in the laying out of Victory driveways and in the setting for other forms of memorial. All this is in line with the suggestion of the American Forestry Association that trees be planted as tributes to the sacrifices of the country's heroes.

Arbor Day took on a meaning in many states this year which it has not possessed since its first observance in the United States more than forty years ago. It was made the occasion in many places for dedication of the



THE "FATHER OF FORESTRY" IN PENNSYLVANIA—DR. J. T. ROTHROCK, OF WEST CHESTER

Known, loved and honored as a pioneer in forestry, not only in his own state but all over the country. Dr. Rothrock, who is a vice-president of the American Forestry Association, recently celebrated his eightieth birthday, and on Arbor Day the State planted eighty trees in his honor.

enjoy greater happiness and peace. The men who gave their lives for their country would ask no better, no nobler, no more lasting memorial than that they live in the hearts of their countrymen. This is being accomplished through the parks, community centers, memorial drives and roadways and similar city, town and county betterment plans that are being worked out.

Tree planting is a feature of most of the memorials which communities all over the country are erecting to

trees planted to men who had paid the supreme sacrifice, as well as to some of the leading figures in the war, including President Wilson, General Foch, General Pershing, and others whom the community took this fitting opportunity to honor. In Pennsylvania, for instance, it was selected for the setting out in one of the state forests of eighty trees in honor of Dr. J. T. Rothrock, the "father of forestry" in that state and a vice-president of the American Forestry Association. Arbor Day was very

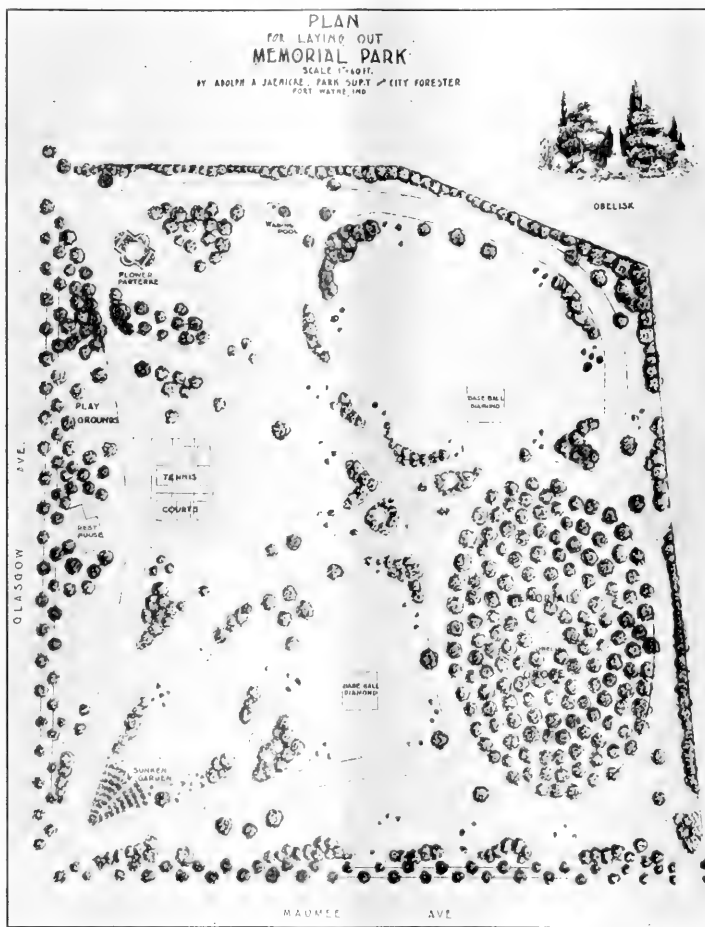
generally observed throughout Ohio, the school children being particularly active in planting trees in school grounds to former students who had gone into the service. In Cincinnati among the schools which planted trees on that day were Whitter, Bond, Hill, Westwood, Oakley, Vine, Washington, Carson, Opportunity Farm school. At Millville, New Jersey, each of eight schools planted a tree in one of the city plazas. Simple and impressive dedi-

catory services were held as a rule with the plantings. One of the most touching of these was that at Burlington, New Jersey, where the baby hand of little Eleanor MacFarland tenderly clutched the branches of the tree which was planted in honor of her father, Dr. James MacFarland. When Mrs. Frank L. Johnson, president of the Civic League, at the conclusion of an address in which she spoke of the beauty and the value of trees and of their fitness as memorials, came to the naming of the tree in honor of Dr. MacFarland, who died on the battlefield in France, his little daughter was lifted up and her hand placed on a branch beside that of Mrs. Johnson. All the schools in the city took part in the ceremony, which included the reading of a letter showing how the dead hero had won the Distinguished Service Cross for helping comrades under fire. As these men fought for a better America, so are they honored most in memorials

which represent service, which stand for civic improvement and betterment and for the happiness, development and uplift of all classes. A fine example of the new community spirit which is being built up, of the finer Americanism which is being developed was displayed by the town of Reading, Massachusetts, on April 19, observed throughout the state as Patriots' Day, when everybody in the place turned out to help convert an eleven acre tract

which had been donated to the city into a soldier's memorial park. Prosperous bankers and shopmen, men, women and children, worked together side by side with shovel and hoe, to make a place where the community might enjoy itself. Thirteen elms were planted in honor of the men from that town who had given their lives in the war, while several thousand other trees and shrubs were set out.

In this connection a most interesting group plan is being worked out by the Sharon County Church Community Center, Farmington, Iowa. There a two-day program with exercises devoted to the development of



PLAN FOR MEMORIAL PARK

This is the way in which Fort Wayne, Indiana, has prepared to honor her soldiers. The large memorial grove in one corner of the park contains four and a half acres of oaks, each tree a memorial to a fallen soldier. Playgrounds, tennis courts, baseball diamonds and other means for community improvement are provided.

placed on a branch beside that of Mrs. Johnson. All the schools in the city took part in the ceremony, which included the reading of a letter showing how the dead hero had won the Distinguished Service Cross for helping comrades under fire. As these men fought for a better America, so are they honored most in memorials

the park and playground have just been held and the special tree-planting day was designated as Roosevelt Day, because as Rev. Edward Roberts, pastor of the church, said in his communication to the American Forestry Association, "the present country life movement began with the report of the Commission on Country Life

appointed by Mr. Roosevelt; and this constitutes added reason for the participation of country churches in this memorial feature." Plans for the tree planting at Sharon working harmoniously with other community development schemes, were prepared by the landscape extension department of the Iowa State College. Such plans as those being put into operation at Sharon are powerful factors in encouraging the forward to the land movement. At Sharon there are directors of domestic science, recreation, children's play, athletics, gardening and all other social activities tending to better living conditions.

Anything that tends to city beautification makes for general social betterment. The work being done in set-

both for patriotic and civic reasons. It will turn a place hitherto unattractive into a beautiful spot, thereby benefiting the city as well as honoring it."

In Philadelphia the trees to be planted in honor of that city's soldiers and sailors include a group of 500 in Logan Square, surrounded by the Cathedral and other historic buildings. This section of the city is being converted into one of the garden spots along the Parkway which extends all the way from City Hall, in the heart of the business district, out to spacious and beautiful Fairmount Park. Philadelphia is planting trees in many other places. Three oriental planes have been set out in Franklin Square in memory of the men from the fifth local draft board. Seventeen trees of the same variety



Photograph by Dayton News

PAYING TRIBUTE TO OUR NATION'S HEROES

Pupils of the Harrison School, Dayton, Ohio, as part of their Arbor Day celebration, planted fifty-five trees in honor of former members of the school who were in army or navy service. They also honored in a similar way President Wilson, Generals Foch and Pershing, Governor Cox and General William Henry Harrison after whom their school was named.

ting out miles of trees through parks and of planning new parks, therefore, is most commendable. Minneapolis is placing several miles of trees through its extensive park system. From Spokane comes the report of the planting of a mile of maples along one of the finest residential avenues. Mrs. Sam Jones, president of the War Mothers of Atlanta, which organization was responsible for the conversion of Pershing Point into an attractive park, says in speaking of the project: "We feel that we are going to provide something of which Atlanta will be proud,

were planted in Disston Park, Tacony, a suburb, in honor of the men from that community who lost their lives. Between the rows of trees a flower bed in the shape of a keystone has been placed and in the center of this a marble cross is to be erected.

"We cut the trees down ruthlessly, but the time will come when we will wish that we had more trees," declared J. L. Dumas, in addressing the Western Washington Horticultural Association at Everett, Washington, recently. He then went on to say that he knew of no

better movement than that of planting memorial trees to soldiers and sailors; and he added:

"I think that we should join in the great movement for planting trees along the roadsides." In Missouri one community has named a newly-constructed highway after its first son who gave his life in the service. Improvement of highways and tree planting go hand in hand and trees are being planted along highways in many parts of the country. Different species of trees are to be planted along the various roads in Michigan for which \$50,000,000 has been voted, according to W. S. Linton, of the state tax commission and a member of the state good roads association. Along the highway from Chicago to

suitable seeds, scions or trees for planting under the provisions of this act, and to establish proper rules and regulations for distributing the same at nominal cost, or otherwise, to counties, townships, cities, villages, and citizens of the State for the aforesaid purposes, and also for State parks or other public places.

"It shall be unlawful to cut, destroy, injure, deface or break any ornamental, nut bearing, food producing or shade tree upon any public highway or place, except where such trees shall interfere with the proper construction or maintenance of such highways. It shall be unlawful to affix to any such tree any picture, announcement, play-bill, notice or advertisement, or to paint or



ANOTHER PLAN FOR MEMORIAL PLANTING

Here is an example of how cities are planning beauty spots to include both memorial and the planting of memorial trees. This suggestion by E. Burton Cooke is for "Pershing Park" in Atlanta, Georgia.

Saginaw walnut trees are to be planted and this will be called the Victory Highway. The people along the route have promised, he reports, to improve and beautify their property. This is a good illustration of the way in which tree planting leads to other civic improvements.

A tree planting bill introduced by Senator Harvey A. Penney has passed the state legislature and been signed by Governor Sleeper which makes a special point of food producing trees. It provides among other things as follows:

"The Michigan Agricultural College and Public Domain Commission are hereby authorized to grow and acquire

mark such tree, except for the purpose of protecting it, or to negligently permit any animal to break down, injure or destroy any such tree within the limits of any public highway. Any person violating any of the provisions of this act shall be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not less than one dollar or more than twenty-five dollars, and in default of payment of any such fine may be imprisoned in the county jail for a period not exceeding thirty days. Such person shall be liable to the owner of the trees for treble the amount of damages sustained."

A resolution favoring the memorial tree plan of the American Forestry Association and urging the people "to plant nut-bearing trees wherever possible," has been adopted by the Paper Shell Pecan Growers' Association, of Illinois, J. M. Patterson, president, and Robert S. Carson, secretary.

In Fort Wayne, Indiana, a new park has been started in the east end of the city to be known as Memorial Park. It will be forty acres in size and will have a memorial grove of four and a half acres planted with oak trees, each tree in memory of a fallen soldier.

Rotary clubs throughout the United States have been leaders in many cities in adopting the memorial tree method of honoring their members. In Jacksonville, Florida, the club has given its approval to a plan for the purchase of a large city block which would be converted into a memorial park with an arch in the center and with groups of trees. S. H. Squire, president of the Elyria (Ohio) Rotary Club, reports the planting there of thirty-eight Norway maples in the grounds of the hospital in honor of the men from that town who gave their lives. Other civic organizations participated in the ceremony.

Don E. Mowry, general secretary of the Madison (Wisconsin) Association of Commerce, reports that the Girls' Civic League of the Association has planned to plant memorial trees in that city.

There are many places and much land not suited for agricultural or other purposes but which would make excellent land on which to start trees. The Michigan Agricultural College through its forestry department

is planning more than 75,000 trees among the sand dunes in some of the Western Michigan districts in an effort to check the shifting of these big sand piles. It is estimated that the trees which the town of New Bedford, Massachusetts, has set out in the past few years will be worth at least \$1,000,000 in twenty-five years. This commercial phase of the matter is worth any town's consideration. New Bedford claims to hold the record in New England for the number of trees in proportion to its street mileage.

In France they are going to convert historic Vimy Ridge which saw some of the bloodiest and fiercest fighting of the war into a vast memorial park to the Canadian soldiers. Pitted as it is with shell holes and craters made by mines it can never be turned again into agricultural land; and so the Canadian government will plant on it the maples of Canada. It has been suggested that in the same way the Argonne be made an American park, a shrine hallowed by the blood of American soldiers.

No meaningless memorials are those which are being erected today in city, town and hamlet to the sons of America who fought to preserve liberty and freedom. These memorials are taking on the form of community center groups of buildings, parks, playgrounds and recreation places. Thus combining utility with beauty, they will keep ever fresh the memory of the sacrifices made by the nation's heroes and serve both the present and the coming generations. In this united service tree planting takes a prominent part.

A NATIONAL FOREST POLICY--WHY AND HOW

THE solution of the forest problem in the United States depends largely on what is done with the private forests. Even with the most liberal sort of a policy looking to the protection of our public forests, including the acquisition of additional areas, it is upon the private forests that the future largely rests.

This is emphasized by a few striking facts which have recently been pointed out by Henry S. Graves, Forester, United States Forest Service. Colonel Graves has called attention to the fact that 97 per cent of the timber and other wood products used in the United States is obtained from privately-owned forests and that less than two per cent of the saw mills of the country are operating on public forests. Private owners hold four-fifths of the nation's standing; furthermore this is the best and most accessible timber. Almost the entire supply of certain important commercial species, such as white pine and spruce, southern pine, cypress, redwood and most of the hardwoods, is in the hands of private owners.

It is certain that few people realize the seriousness of the situation. There is need of an awakened public consciousness in order that remedies may be applied before it is too late for them to be of any avail. As Colonel Graves points out "we have hardly begun to stem the tide of forest destruction;" and there is need not only of a large program as far as the public forest lands are

concerned but even more a radical change in regard to destructive cutting on private forest lands.

So rapidly is the available supply of timber being exhausted in some parts of the country, the South and the East particularly, that if the war had come fifteen years later "we would have had very great embarrassment in obtaining even the lumber needed for general construction," as Colonel Graves points out, "except at great sacrifice of time, cost and crowding of the railroads." Most of the lumber would have come from the Pacific Coast. Here are a few further facts in this connection which it is well to consider. Most of the original supplies of yellow pine in the South will be exhausted ten years from now, according to the manufacturers, and within the next five to seven years more than 3,000 manufacturing plants in that section will go out of existence. This means a moving of the lumber production center to the Pacific Coast.

What such a shift means, with the loss of competitive influence, can readily be surmised when it comes to prices and its effect upon the lumber industry and related trades and occupations. It is estimated that the Lake States whose supplies of timber only a few decades ago seemed almost inexhaustible, according to the narrow views which then prevailed and which still hold in some quarters, already are paying a freight bill of \$6,000,000 a year to

bring in lumber and like products from outside sources. New England is cutting every year for lumber and other uses twice as much timber as is being grown there; and this affects a region which employs nearly 100,000 wage earners and has about \$300,000,000 invested in the wood and forest industries.

What is true of New England is true of nearly every other part of the country. Wood is being cut without provision for proper replacement of the old stock. In cutting on private lands there is little regard for future supply, although some owners and groups are endeavoring to handle their lands constructively, but on the whole destructive processes are permitted which retard or actually prevent the succession of a good forest growth. The welfare of the country, its future economic progress and prosperity, demand that strict laws governing protection against fire and compelling proper cutting which will conserve a future supply, be made to apply to the private as well as to the public forest lands of the United States.

"There are certain things that the public should do, and in a liberal spirit," declared Colonel Graves, at Boston, "to make forestry by private timberland owners possible and effective. At the same time the public should insist by adequate legislation that the destructive processes be stopped, and that methods be adopted which will leave the forests in a productive condition. To secure these ends there is necessary a broad program that is practicable and equitable, based on consideration of existing economic conditions." In his Chicago speech the Chief Forester expressed the belief that along certain lines "the lumbermen are going as far as they can to improve the internal situation."

But there are certain big phases of the situation, he went on to argue, which call for co-operation between all interests concerned, between the national and the state governments, the lumbermen and the public and existing agencies, in order that the welfare of all may be conserved. For the question of forest renewal which is the backbone of the whole situation "is not only of interest to the public," he says, "but it is of vital concern to the owners of timberlands."

There is need for prompt action, Col. Graves makes clear. He declares that there is growing "public uneasiness" and that "public demand for action is increasingly insistent." Efforts of a local character, or which do not deal with the problem in a big national way, will not answer, he says. "Now is the time, therefore, to bring about action in accordance with broad constructive plans, rather than by piecemeal legislation by the different States, uncorrelated with each other, and with action of the Federal Government."

As to the action which he has taken looking toward the adoption of a national forest policy, the head of the Forest Service announces that he has initiated "a series of conferences with forest agencies of the states and with representatives of interested institutions and organizations." These conferences, he hopes, will form the basis in "laying the groundwork for a national policy."

Among some of the facts to which Col. Graves calls attention in connection with his discussion of the problem are the following:

1. The original supplies of yellow pine in the South will be exhausted in ten years; and within the next five or seven years more than 3,000 manufacturing plants will go out of existence.

2. Within the last 10 years new mill development for news-print manufacture in this country has almost wholly ceased, while in Canada during that time no less than 28 mills have been built, largely with American capital.

3. The Lake States, which a few years ago were the greatest producers of timber, are today paying a freight bill of about \$6,000,000 a year to bring in lumber and other products from outside sources.

4. It is estimated that fully 30 per cent of all the lumber now used in New England comes from outside the region; and this is in addition to the importations of large quantities of pulp wood.

5. Many important wood-using industries are already embarrassed for supplies.

"The policies of the Government and the States during the next few years in matters relating to forests and lumber will be of far-reaching importance," says Col. Graves. "Conditions created by the war present certain problems of urgent interest to the lumber industry that will require definite action by the Federal Government." There are conditions, he asserts, "which both from the standpoint of the lumber industry and of the general public welfare demand constructive action."

In pointing to the urgent need of a national forest policy, the Chief Forester makes this statement: "The dissipation of our forests goes on with no let up, and still for the most part without any provision for the continuance of the forests after lumbering. Exhaustion of local forest supplies, the closing of industries dependent on them, the embarrassment for supplies of the pulp mills and other consumers using special classes of forest products, the generally mounting prices to consumers, are other factors which are calling sharp attention to the effect of forest destruction, and are causing increasing public uneasiness." He declares that lumbermen are giving thoughtful attention to the needs of the industry and they recognize that many things of a helpful and constructive character can be done within the industry in the way of cost accounting, economies in manufacture, scientific merchandising and so on.

"But neither the lumber industry nor the public can ignore the fact," he goes on, "that the great fundamental problems, which not only involve the permanence and stability of the interests dependent on our forests, but also gravely affect the national welfare, are not being solved."

These problems he divides into four general groups:

1. Those relating to the causes of over-production.
2. Those that concern the supply, character, well-being and stability of labor.
3. The problem of the continuance of private forests and of stumpage supply; and

4. Certain questions relating to the public forests.

As to the first of these—over-production—he says that “the elements which caused the unstable condition of the lumber industry prior to the war still remain, and constitute a danger for the future.” Speculative character of timberland ownership, pressure to liquidate, difficulties of financing stumpage, excess mill capacity, the unorganized character of the industry, these were among the factors, he declares, that led to premature cutting and over-production, with its depression, losses, failures, interrupted operation, intermittent employment and other ills. “I do not see,” says Col. Graves, “how there can be a permanent basis of conservatism, stability and individual strength so long as this condition exists.”

“The public is concerned because of the injury and loss that accompanies demoralized industrial conditions, and because under such conditions there is increased waste in lumbering, protection from fire is less efficient, and the difficulties in the way of forest replacement are intensified. Failures that occur at such times often result in a transfer of lands, thereby increasing the tendency to centralization that may operate disadvantageously to the public in the long run.”

Taking up then the labor problem, this is the summary of the opinion: “Temporary adjustments will doubtless be found, but a final solution will come, I believe, only with the placing of the lumber industry on a basis of stability and permanence.”

Concerning waning timber supplies, the Chief Forester asserts: “We have been lulled into a feeling of security in recent years because we have an estimated total quantity of standing timber in excess of twenty-five hundred billion feet. The very situation to which I have referred of industrial instability due to the pressure of large quantities of stumpage for production adds to the impression that we have so much timber in reserve that we do not need to concern ourselves about supplies of forest materials.”

“Not only the public, but many economists, have been misled by statistics showing the aggregate of timber still standing in the country. Forest depletion is injurious long before the last tree is cut and long before all but the last center of production is exhausted. When local resources are so depleted that industries close, the question of vanishing supplies takes on a new significance. And this is exactly what is happening in hundreds of communities. The forest supplies are used up; the chief industry, a sawmill, a box factory, or a wood-working establishment closes. Subsidiary industries dependent on the primary undertaking have to close also. And what is more, the land formerly producing the timber, if non-agricultural, is left in an unproductive condition and a burden for many years on the community.”

Col. Graves referred to “many important wood-using industries.” As “already embarrassed for supplies,” especially acute being the situation faced by the manufacturers of news print paper in the northeast, in the Lake States and elsewhere, who had enormous

investments in mills, water power and equipment.

But it is not so much the amount and character of timber now standing which concerns him as the production of new crops. “I would have little concern about the amount of timber used if we were growing new stands in place of the old. We have enough non-agricultural land to produce for all time timber in abundance for ourselves and for export. But this would require keeping our forests in a productive state after lumbering.

“We are not doing that,” he continues. “Our forests are steadily deteriorating under cutting and fire. No effort is made for replacement after cutting. We are still drawing for the most part on original sources of supply. Failing to replace these, we are steadily losing ground.

“The question of forest renewal and growth is one that can no longer be ignored. It is not only of interest to the public but it is of vital concern to the owners of timberlands.”

After expressing the opinion that “the transfer of great bodies of timber from public to private hands was a grave mistake of public policy,” although “the action was taken and we can not undo it,” Col. Graves asserts that the problems resulting from this policy cannot be ignored “and whether they like it or not the private owners have the problem of the right handling of a large part of our forests actually on their hands.”

“On the other hand the public has a very essential interest in the question of keeping the lands in a producing condition so as to render a maximum of service, in supporting industries and local communities, and in serving to support through tax levies public enterprises of various kinds. Even though the public has surrendered its direct ownership of the timberlands, it cannot afford to permit them to be handled in a way injurious to the welfare of the community.”

The existing public forests are not extensive enough or widely enough distributed to meet more than a part of the public needs, the Chief Forester points out; and so “we must continue to rely in considerable part on private lands, both for present supplies and for growing timber for the future.”

This private ownership combined with a public responsibility which “has never been fully sensed or accepted,” results in a “perplexing dilemma.” “It appears to me that the situation is an impossible one that cannot long continue.

“As I see it,” he declares, “either private owners must assume the full responsibility of properly caring for their timberlands, including protection and forest renewal; or the public must take over the responsibility that it once had and surrendered; or the public must share with the owners both the responsibility and the burden of securing the objectives that are essential to safeguard the public welfare. My own view is that the last is the only fair and practical method from the standpoint concerned.”

In speaking of the public forests and their needs, the head of the Forest Service says that although they are being protected from fire, the timber being used as called

for by economic conditions and the cutting conducted so as to leave the land in favorable condition for the next timber crop, nevertheless there is need even from the standpoint of the handling of the public forests of a correlated public or national policy. This is true because "the manner in which the public timber is handled may vitally affect the lumber industry" and because "the problems of the lumber industry may affect the interest of the Government in the administration of its own forests." The question of cut-over non-agricultural lands and to what extent they should be taken over by the public, especially those on critical watersheds and on steep slopes, these and various other problems must be considered in connection with the forest situation as a whole.

"The problems which I have set forth," says Col. Graves, "touch many interests, both public and private. Their solution involves Federal and State legislation; and also involves co-operation between public agencies and the lumber industry. The different problems are closely interrelated with one another. Moreover, action in one section of the country concerns the interests of other regions. These circumstances make it clear that for a final solution there must be a far-reaching program that will enable the Federal Government, the States, communities and the industrial forces to unite in a common effort. Many efforts have been made to find a solution for some industrial features or some public features of the forest and lumber problems, and have failed because they have left out of account some outstanding question that must be solved at the same time."

Remedies hitherto proposed have had serious defects and have proved inadequate, in the opinion of Col. Graves; and he cites as an instance, the proposal made when the Clayton Act was under discussion that agreements be permitted which would allow curtailment of production when justified by industrial conditions. This and a similar proposal put forth in a referendum by the Chamber of Commerce of the United States, had two serious defects: "The vital object of the public to secure a continuance of the forests is wholly left out of account, and it would not, in my opinion, be really effective in bringing about a condition of permanent stability."

A second suggestion which he mentions, namely, that the public co-operate in the conservative financing of timber holdings through long-term loans at low rates of interest, is "only a half-way measure," in Col. Graves opinion, and "does not make any provision for the permanence of the forest." As to "tax reform" he declares that this would not accomplish the desired results. The various forms proposed "have made little headway, because for the most part they have not provided for meeting certain economic difficulties."

"In approaching the question of a national lumber and forest policy," says Col. Graves, "involving perhaps some radical departures from the present principles of relations between the public and industry, we shall find, I believe, that the most important and fundamental questions relate to the speculative character of forest owner-

ship. Such ownership means cutting as fast as possible and without reference to how the land is left after lumbering. What is needed is some strengthening influence that would make possible the husbanding of the resource and its conservative use, as the public would use it if it had retained control over it and at the same time provide for the continued productiveness of the land.

"I am ready to advocate a policy more far-reaching in all respects than has generally been offered. I would afford whatever public assistance is needed to make possible the conservative handling of our forests, and I would then make fire protection, conservative production of lumber, and right methods of removal a matter of requirement, with such public direction and control as is necessary to realize the aims desired by the public."

The action required "may vary in different regions," according to Col. Graves. It may be a combination of several methods of public co-operation; in some localities the tariff or local taxation may play a large part in the situation; again the adjustment of international relations, the reform of taxes and other public measures must be considered; or where public and private lands are intermingled a plan that would co-ordinate all forest lands within economic groups—these are some of the factors which, it was said, would have to be considered.

"In all regions there is needed a broad policy of forest development, a policy which makes for permanent mills and all that means to the employment question, which places timber on the market only as it is needed, which protects the present resource—a difficult matter now even under the most earnest efforts to co-operate—and which classifies the land, encourages agriculture, puts to its best use every acre, and secures tree growth on non-agricultural lands."

The Chief Forester declared that he is in favor of "a greatly enlarged program of acquisition" of cut-over non-agricultural land, second-growth forest and protective forest which should be well distributed through all the forest regions and as they are acquired should be organized as municipal, state or national forests.

MINNESOTA will have a forestry appropriation of \$85,000 this year, due to a change of heart toward the state forestry department in the closing hours of the State Legislature, which resulted in saving that department and the aforesaid appropriation of \$85,000 a year. This is \$35,000 a year more than was allowed two years ago. It is specified that not more than \$10,000 be spent for reforestation, and not more than \$12,000 for administration. The balance, \$63,000 a year, is to be spent for forest fire prevention and protection.

THE tallest trees of the United States, says the *Canadian Forestry Journal*, are the California redwoods or the Douglas fir. Both claim the distinction of being the tallest, and it is an even match between them. A maximum of about 350 feet is the greatest, though a little more than that has been claimed. There is no question that in trunk diameter the redwood, that species known as sequoia, is the champion.

EXCLUDING ENEMY ALIENS WITH APPETITES DE LUXE

BY CHARLES LATHROP PACK

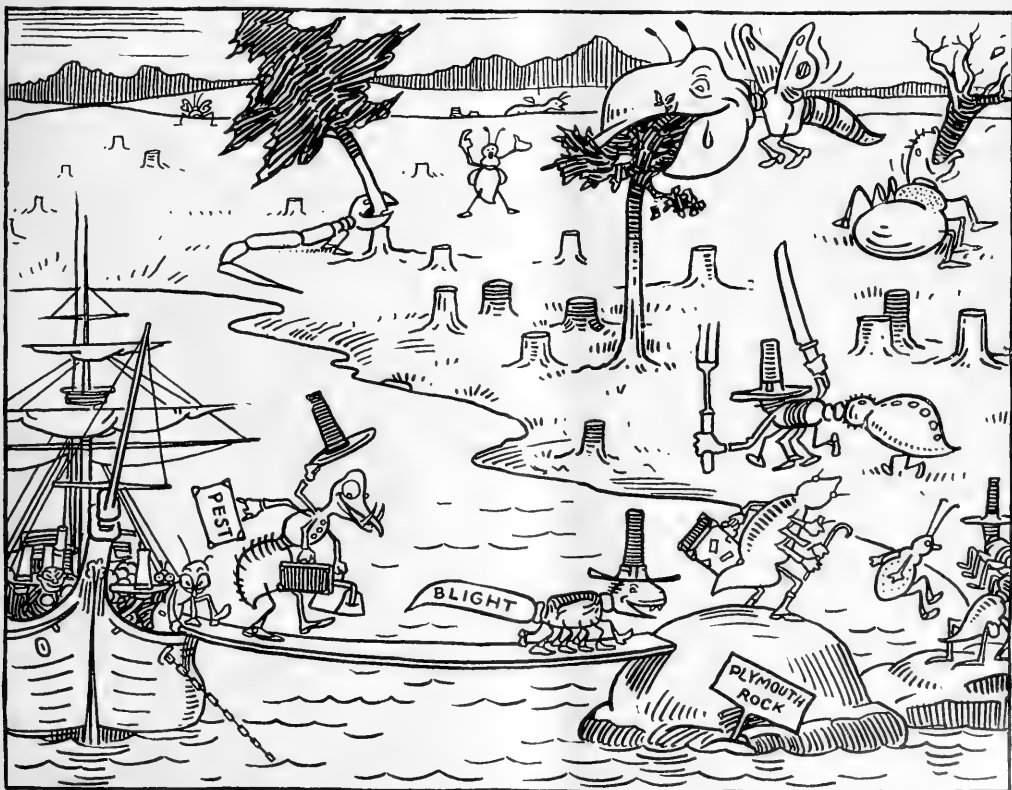
PRESIDENT, AMERICAN FORESTRY ASSOCIATION

A \$500,000,000 banquet to alien enemies has been given annually by the American public. These aliens were not invited here, have performed no service, and yet have been fed on the fat of the land, adding to the high cost of living. They have tremendous appetites, consuming trees or entire forests, garden crops and fields of grain and cotton. These undesirable citizens that have made America their adopted home are insects and plant diseases which have been introduced from foreign countries. The recent quarantine issued by the Secretary of Agriculture, restricting the importation of nursery stock, assures us that the treasonable activities of these enemy aliens will be curbed in the future.

There's a pest for every plant. Adam must have been an aged man before he got married if he first took time to name all of the insects and fungi. It would require the life-time of an ordinary man even to pronounce the names which scientists have given to the known species and every day sees new discoveries added to these lists. The gardener and the fruit grower, the farmer and

the forester spend a great deal of time and money in combating pests. Some plants have more than a thousand insects and fungus diseases which attack some portion of them, causing death or injury. However, most of the pests which attack our plants are native to America and have natural enemies which keep them in check. "And all those fleas have little fleas, upon their backs to bite 'em; and those again have lesser fleas, and so *ad infinitum*." Thus native insects have a host of voracious enemies, including birds, animals, and other insects, which preserve the "balance of Nature." The ravages of native pests seldom become devastating except occasionally in small areas and for a short time when conditions become exceedingly favorable for their rapid propagation.

Hitherto, America has maintained an open door to plant immigrants and, year after year, destructive insects and plant diseases have come to this country on these plants from abroad. Some of these pests have found the Land of Freedom entirely to their liking. Sometimes the climate here has been exceptionally favorable for their rapid development, at other times they have found new



THE LANDING OF THE PILGRIM FATHERS

food plants. In such cases they have propagated rapidly because the balance of Nature was no longer maintained. They escaped from the enemies which held them in check in their own country, with the result in many cases that they increased so amazingly and wrought such tremendous damage that even the easy-going "pacifist" American public has been forced to fight them. In most cases, however, the fight against imported plant pests has been begun too late. We have waited until they became so thoroughly established over a wide area that it has been too expensive to apply eradication measures that would have been effective in the beginning.

Comparatively recent experience with imported pests has made it apparent that the bug is blightier than the sword. The uncontrolled ravages of the late blight and rot of potatoes in 1916 was responsible for the shortage in the potato crop which sent prices soaring and brought the humble spud into prominence hitherto unknown. Powdery scale and scurf are two other potato diseases which have been brought in from abroad. More recently, the potato wart disease, established in Pennsylvania from European importations, has given cause for alarm. The Hessian fly, introduced from Europe in Revolutionary times, causes an average annual loss to the wheat crop of fifty million dollars, and in some years the loss from this one insect has exceeded 100 million dollars. The loss of fruit due to the codling moth, together with the money spent in controlling this insect, costs the United States about 16 million dollars a year. Another imported fruit insect, the San Jose scale, entails a loss of at least 10 million dollars annually.

The tale of the gypsy moth, in ribald rhyme, illustrates



WHERE, OH WHERE IS MY LITTLE TREE GONE?

what happens when an insect reaches the United States from another country. To paraphrase:

There was a man who freed two moths,
And those two moths were mothers,
That year there were a million more,
The next a million others.

They had tremendous appetites,
And wrought great devastation,
Until the State with wrath arose,
And fought like Carrie Nation.



THE RAVAGES OF CHESTNUT BLIGHT

A forest of American chestnut trees destroyed by the chestnut bark disease, a pest introduced from China. This disease passes directly from one chestnut tree to another and no remedy has been found for it. The disease was first found in the vicinity of New York City, in 1904, since which time it has spread to Massachusetts, and southern New Hampshire, western New York, Ohio, West Virginia and North Carolina.

In this case an investigator was experimenting in Massachusetts with two gypsy moths imported in connection with an experiment in silk culture. Unfortunately the door of the cage was accidentally opened and the insects escaped. The investigator immediately notified the authorities of the danger but no attention was paid to the warning. A few years later the trees on a small area were defoliated but still no concern was manifested. However, the next year the insects became so numerous that a large territory was invaded by them and the authorities at last woke up. A fight was begun which has lasted for years and today it has cost more than 15 million dollars in cash for applying control measures, beside many times this amount of property damage.

"What next?" is constantly asked by the nurserymen, fruit

growers and farmers, when told of a newly imported and dangerous plant pest. It would seem as though the time had arrived when in order to grow a tree it is necessary for the one who wishes to harvest its fruits to stand guard over it day and night, armed with a spray can. Many a man has planted a tree and dreamed of the enjoyment he would derive from it as he rested under its benign shade, only to awaken some morning and cry "Where, Oh, where is my little tree gone?" Observe the classic example of the chestnut blight. This is a bark disease which was brought to this country from the Orient on Japanese chestnut nursery stock. It was first found on western Long Island in 1904 and two years later it had reached southward to Philadelphia. In ten years it spread over half of the chestnut area of the

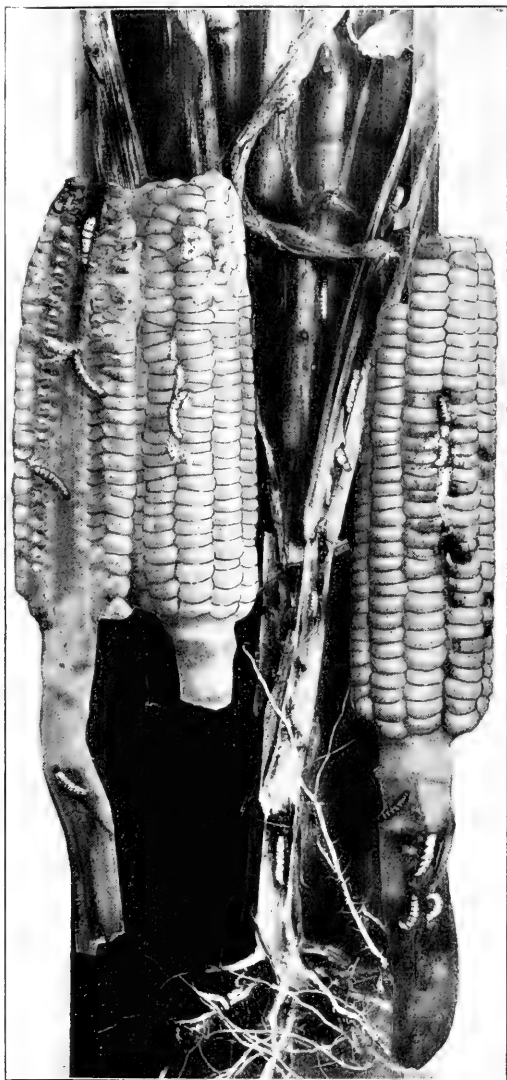


AT THE END OF THE STRUGGLE FOR LIFE

This once magnificent chestnut has now almost succumbed to the chestnut blight. It is difficult to estimate the enormous financial loss caused by this disease, but a hundred million dollars would seem to be a conservative figure.

United States and at the present time it has practically exterminated the chestnut trees within a 100-mile radius of New York and is rapidly accomplishing the complete ruin of our magnificent chestnut forests of the South. The loss caused by this single imported pest is many million dollars and its ultimate end will be the extinction of one of the most useful and most profitable American forest trees. Only recently it was found that a similar disease attacking the poplars had been imported from the nurseries of France and had spread over a wide area of the United States.

Other dangerous pests introduced from abroad are the Oriental peach moth, the Japanese beetle, the European earwig, the Leopard moth, the alfalfa weevil, the European elmworm, and the European corn borer. The latter is a pest which apparently was brought to the United States in a cargo of hemp unloaded at a rope factory near Boston, Massachusetts. It is exceedingly destructive to corn, feeding by boring in the stalk. In its operation it works upward, eating out a chamber from the



Photograph by courtesy Massachusetts Department of Agriculture

BEWARE OF THE EUROPEAN CORN BORER!

The European Corn Borer has made its appearance in Massachusetts, Connecticut and New York. The corn borer was probably brought into this country several years ago, possibly on hemp, and from its present distribution it would seem as though it was first established in or near Charleston, Massachusetts. It has spread rapidly and is now known to be present in not less than thirty towns in Massachusetts, mostly north and northwest of Boston. This insect winters over as a caterpillar in corn stalks and some of the larger weeds. About the middle of May it pupates and emerges as a moth which lays a large number of eggs, sometimes as many as 700. The caterpillars from these eggs feed upon early corn and weeds and do considerable damage. About the last of July these caterpillars pupate and early in August another generation of moths appear. These lay their eggs (this time about 900) on corn and weeds (principally corn) and do a vast amount of damage, feeding on the stalks and ears of corn. It is this caterpillar or borer, that passes the winter in the corn stalks and large garden weeds, such as pigweed, ragweed, and barn-yard grass. The caterpillar which was present in the old corn stalks early in the spring has been responsible for 315,000 borers up to the first of October. As this insect passes the winter in corn stalks and weeds, very effective destructive measures are offered. Pull up and burn all corn stalks together with all old vines and all large weeds throughout and around the garden.

ptth. The developing ears are also sometimes hollowed out. As high as 90 per cent of the stalks in a corn field may be infested. Over 200 borers have been found in the stalks growing in one hill of corn. Control is made more difficult by the fact that the borer feeds on a number of other plants, including the stalks of weeds and flowers, and may live over winter in grass roots.

Many people believe that we have been bringing in plants from abroad for so many years that now we have

all of the pests to which plants are heir. This is a mistake, in the opinion of plant physicians who are best qualified to know. The Bureau of Entomology, United States Department of Agriculture, has published descriptions of over 3,000 distinct insect pests which are likely to be introduced into this country and cause serious loss. About half of these are European insects which feed upon forest and shade trees and the balance infest various cultivated crops. Among the important insects which it is hoped to exclude from the American continent are the Mediterranean fruit fly, considered by entomologists to take first prize

as a destructive fruit pest, and the pink boll worm of cotton, from Mexico, which is capable of making the best efforts of the cotton boll weevil appear puny in comparison. The life stories of some of these pests, as unfolded by years of study on the part of patient scien-

tists, are so amazing as to be classed with fairy stories by those who are little acquainted with the wonders of Nature. White pine blister rust is an instance. This parasitic fungus is native to the Old World, attacking the stone pine and other native five-leaved pines of Europe. When extensive interest in planting forest trees first began to develop about a score of years ago, white pines imported from Germany, France and Holland, brought this disease to the United States, principally in 1908 and

1909. Curiously, the safety of our white pines depends entirely on whether we can control the spread of the disease on currant and gooseberry bushes. The fungus cannot go directly from one pine tree to another but first must spend part of its life on currant or gooseberry leaves and in this stage it has the power of spreading rapidly and widely to other currant and gooseberry bushes. The fungus then develops another stage by which it is enabled to pass from the currant or gooseberry bushes back to the pines. If we destroy the currant and gooseberry bushes we prevent the disease from



Photograph by W. S. Carpenter, New York Conservation Commission
STRANGLED TO DEATH

A native ten year old white pine tree which has been girdled by the white pine blister rust, a fungus of foreign origin first found in America in 1906. The cankered area above the ax is due to the killing of the bark by the growth of the fungus. The disease has progressed to such an extent that the sap is being cut off from the top and the tree is in the last stages of destruction. This disease cannot be transmitted directly from pine to pine but must pass through an intermediate stage on currants or gooseberry bushes. To prevent white pines from becoming diseased, remove all currant and gooseberry bushes from the vicinity of the trees.

infesting our white pines. Hence, improbable as it appears to the uninitiated, the salvation of these magnificent trees depends to a large degree on whether people are willing to forego the luxury of currant jelly and gooseberry jam. Congress has passed a literacy test

which will bar undesirable human immigrants, but there is no test which we can apply to exclude the army of injurious insects and plant diseases from abroad which enter as stowaways on nursery stock and other plant material.

The system of inspecting the importations of foreign nursery stock has proved ineffectual because the eyesight of the most competent inspector is not capable of discovering every insect or plant disease on every plant. Many of them, especially fungi, are hidden under the bark and are entirely invisible. It must be remembered that of many of these pests we have no conception, based on experience in its native land, as to its destructive powers under American conditions. Fumigation has been tried but it is manifestly impossible for any gas or liquid to penetrate to the interior tissues of a plant where fungus or borer may be hiding. The question "what shall we do about it?" has been answered correctly by the Federal embargo, which prohibits further importation of plants from abroad except such as are specifically sanctioned by the United States Department of Agriculture.

The United States is the last great nation to adopt measures to adequately guard against the dangers incident to the introduction of foreign nursery stock. We have thus wasted millions of dollars annually, and there remains the possibility of complete extermination of certain valuable economic plants. It is fitting that this action by the United States Department of Agriculture is taken now when we must conserve all of our National resources to help pay the huge expense of war.

There is always the possibility of bringing in pests in cargoes of merchandise, but the action taken by the Federal Horticultural Board, backed up as it undoubtedly will be by adequate supervision, is certain to prevent great losses in the future. An additional factor of safety is the recently organized American Plant Pest Committee, composed of State agricultural and forestry officials, entomologists, pathologists, and others interested in safeguarding the crops of farm and forest. The purpose of this Committee is to secure quick action for the suppression or control of dangerous pests as soon as they are discovered.

CANADA TO HELP FRANCE

BY ELLWOOD WILSON

G. C. PICHE, Chief Forester of Quebec, has just returned from some months' stay in France and says that the continent will require a great quantity of lumber, especially France and Belgium. Before the war, France was importing three million cubic meters, and Russia was supplying one third of this. The war has so depleted the French forests that they will require at least twenty years rest to be in position to furnish their normal yield. The demand will be much heavier than in the past owing to reconstruction needs and new industries, and will amount to about eight million cubic meters per annum. Canada and the United States will be able to supply a large part of this.

It would be advisable to help the French in their re-

forestation work. The Norwegian Society of Foresters is going to reforest at their own expense 250 hectares. It is suggested that Canadians should plant a tract on say, Vimy Ridge, with Canadian trees, maples perhaps.

The French Forest Service has suffered heavily during the war both by the loss of men and the lack of new men entering the schools. They are short one-third of their personnel which with the addition of the forests of Alsace-Lorraine, will accentuate their difficulties. They are considering a modification of their organization by giving more authority to inspectors.

The School of Forestry was reopened in December, 1917, in the building of the Institut Agronomique, in Paris, rue Claude Bernard. It has also suffered greatly by the war. Now that conditions are better the school is returning to Nancy. The French foresters are eager to return to the beloved forests of Alsace-Lorraine. The Serbs have an important group of young men at the school and it is expected that many more will come from Jougo-Slavia, Czecho-Slavia and Roumania.

A letter received from a prominent Norwegian forester says that there was no crop of *Picea Excelsa* last fall and that no seed is to be had. He also says that conditions in Russia are bad and that labor in Norway is somewhat infected by the virus of Bolshevism.

A letter from a Spanish forester says that conditions of unrest are disquieting and an anti-Bolshevist league has been formed.

LET TREES TELL THEIR GLORY, NOT OUR SORROW

WOULD not memorial groves—living, growing emblems of our sorrow and our pride—be more fitting monuments to our dead in the great war than anything made with hands? Would they not better carry their memorial message to this generation that mourns, and to unborn generations yet to be instructed and inspired? This is the sentiment expressed in *Country Life* in calling attention to the plans of the American Forestry Association both for memorial tree planting and registering such plantings in a national honor roll, as well as its work of helping reforest the devastated battle areas of our Allies abroad.

"What is it that clamors to be told—told now, and told for all time?" Miss Grace Tabor asks in writing on the subject in the magazine. "Not grief at loss, nor personal sorrow, nor even yet a national mourning. These things need comforting, not telling. Thus it is apparent that a very definite and possible thing is proposed in memorial trees—a thing quite as definite as any hitherto known form of monument or memorial even though it is not consummated by the blue print or the stone mason route. That it ties up with the great reforestation work of our own American Forestry Association in France makes it of deeper significance still. For these forests—millions of acres of them—will likewise inevitably be memorial groves to the American dead even though they were not planted to this end. France will make them so for France never forgets."

TREES AS WIRELESS TOWERS

THE tree is a piece of electrical apparatus. During the war trees in this country received wireless messages from the principal European stations for the information of the General Staff of the American Army. This most interesting and important fact is revealed by Major General George O. Squier, chief signal officer of the United States Army.

From ships at sea radio messages were communicated by way of trees to the various receiving stations in different parts of the United States.

Radio telephonic messages from airplanes were readily received by the tree-antennae arrangement. These messages were then transferred to the wires of Washington, D. C., and relayed to any desired point. Thus the linking up of the wire and the wireless methods of communication was found to be convenient and efficient.

General Squier pointed to the significance of the facts which he presented as an evidence of the value of "the physical method of studying all sciences," and he expressed the hope that the data in regard to trees as potential wireless plants would furnish "points of departure for further research."

"The physicist and engineer, accustomed to deal with inanimate matter," he said, "is here confronted with the employment of living vegetable organisms of growing trees. From the moment an acorn is planted in fertile soil it becomes a 'detector' and a 'receiver' of electromagnetic waves; and the marvelous properties of this receiver, through agencies at present entirely hidden from us, are such as to vitalize the acorn and to produce in time the giant oak. In the power of multiplying plant cells it may, indeed, be called an incomparable 'amplifier.'"

"For our present purpose, we may consider a growing tree, therefore, as a highly organized piece of living earth to be used in the same manner as we now use the earth as a universal conductor for telephony and telegraphy and other electrical purposes."

THE Massachusetts Forestry Association announces a most attractive itinerary for the 1919 trip of its members to the National Parks and National Forests. While the purpose of the tour is primarily educational, in making known to our people their great, public playgrounds, it also affords an essentially restful, invigorat-

The Chief Signal Officer called attention to the fact that experiments which had been conducted before the war had shown the possibilities in this direction but that "with the sensitive amplifiers now in use it was possible to receive signals from the principal European stations by simply laying a small wire netting on the ground beneath the tree and connecting an insulated wire to a nail driven in the tree well within the outline of the tree top."

"It was soon found," said General Squier, "that a tree-antennae could be used efficiently as a multiple receiving set over widely different wave lengths, receiving either from separate terminals at the same or different heights of the tree or in series from the same terminal. This same type of circuit was employed in an inverse manner for telephonic transmitting purposes although the experiments thus far have been limited to short distances.

Furthermore telephonic transmission through the tree-antennae was received by another tree-antennae and automatically returned to the sender on a wire system, thus making the complete circuit."

The value of trees in the study of many of the earth's physical problems was emphasized by General Squier, who quoted from an earlier report he had made on the subject, as follows:

"Our great forest areas may exercise an influence in maintaining a general equilibrium between the electrical charges of the upper atmosphere and the earth, which has not been fully realized. On this point comparisons between observations from the interior of great desert areas devoid of any vegetation, with those from other portions of the earth's surface well covered with forests, would be instructive.

"From this viewpoint the general surface of the earth may be considered as supplied by nature with innumerable meteorological observation towers, which possibly may be employed by means of apparatus involving principles already well known to science."

THE TREE—SERVANT OF MAN.

"All through the ages there is shown in literature a feeling of reverence, sympathy and human intimacy with trees. It is significant that this practical thing possessing utility and natural strength, architectural beauty of design, and endurance far superior to artificial structures prepared by man, should be able yet further to minister to his needs."—Maj. Gen. George O. Squier, Chief Signal Officer, United States Army.

ing and delightful way to spend an ideal vacation. The Association hospitably invites its members to make up parties and bring their friends and full information regarding the trip may be had by addressing Mr. Harris A. Reynolds, Secretary, at 4 Joy Street, Boston, Massachusetts.

WANTED—BACK ISSUES

We Need Copies of American Forestry for April, July and August 1918

HIGHWAY FORESTRY AND HORTICULTURE

BY HENRY W. HULBERT

SPEAKING of useful careers for returned enlisted men, handicapped it may be in one way or another for ordinary occupation, let me refer to one line which has been in my mind for a dozen years, and which seems to me altogether practicable. In every rural township in America the roadways take up a very considerable acreage, which, for the most part, is kept in a very unsightly condition and is left to be the breeding place of every bug and weed that can do damage to field and forest. Just so long as a highway is fairly passable during nine-tenths of the year the American public seems content. The advent of the automobile and truck is beginning to awaken general public interest in the road question and doubtless we shall see from now on a steady improvement in roadbeds, bridges and all

adjacent land owners. While a considerable portion of this land is so conditioned and suited that it cannot be made valuable for purposes of cultivation, it all can be a menace to the public in one way or another. Every square inch of it is susceptible of being esthetically improved if not of being made strikingly beautiful.

I can see the smile mantling the faces of perhaps the majority when they hear me say the roadsides of every township in America are capable, by proper care, of being made, in the end, rivals of any arboretum now in the country. What they might lack in variety would be made up in beauty and fruitfulness and practical interest; all placed directly before the eye of the passerby. Private ownership and constant economic need and opportunity are sure to lay low sooner or later every forest in the



WALNUTS AS STREET TREES

A highly desirable tree for street planting, under proper conditions of care and control. The walnut is a hardy and beautiful tree, reaching stately dimensions, and it bears a generous crop of valuable nuts.

other similar practical elements that concern transportation. The oversight of the engineering work involved in these improvements should open out to the returned men an increasingly large opportunity, especially as they have become more or less familiar with the wonderful road-systems of Europe.

But the line of activity I have in mind concerns not the roadbeds and the scientific drainage therewith connected, but with the strips of land on either side of these which ought to average on each hand at least twice the width of the roadbed. Here are many thousands of acres owned by the public and which are most often indifferently cared for, or not cared for, by the officials or the

land thus privately controlled. On the highways and in the public parks, especially set aside, alone, may future generations have sure possession of mature specimens of most of our native trees, not to speak of foreign trees that may well be grown for their beauty or other interest.

Having taxed the patience of my readers thus far with an academic presentation, let me hasten to explain how all this can be financed and made practicable. Of course this cannot be done in a day. It will inevitably be the slow growth of years. But it is altogether feasible to begin at once. That beginning is, *to put a man on the job*. To do this will at once call for one of two conditions: (1) Either there must be a public-spirited township that

is ready to assume this added financial burden in good faith that in the end it will be a paying investment; or, (2) one or two or more public-spirited persons must underwrite a three or five years' cost of trying out this experiment. That in the end the permanent establishment of a township highway cultivation plan will be an asset that will pay for itself over and over again is the belief of the writer. Indeed, an efficient handling of the



THE SYMMETRICAL NORWAY SPRUCE

This ornamental species is particularly appropriate for park and road planting.

proposition will go largely toward paying regularly for the annual local layout on its roads.

In case there is an efficient County Improvement Society or a County Farm Bureau in operation, any township development along this line of roadside cultivation would naturally link itself up with the larger body. The man on the job locally would be working in harmony with a county-wide scheme of improvement. Indeed, it is possible in some instances that at first a county specialist would be put in charge of this work and, later, have township assistants taken on as the work would develop. But from the standpoint of the writer it would be better to have the man on the job a regular township official, working in harmony with any county scheme at hand.

This man on the job must be well prepared for his task. He should know his soil, his trees (botany in general), his entomology and his landscape gardening. He must be a timber, nut and fruit specialist, who can give satisfactory advice to the farmers. He should preferably be a good teacher of his specialty in all the schools of the township, utilizing thus some of the winter months. He might be the general director of school gardens also. A part of his salary might well find its place in the educational budget. Each year he might bring to the town distinguished specialists along several lines and hold, for a week, a convocation for general educational

purposes. The school children would be present, take notes as a part of their regular school work, write essays, pass examinations on the addresses given, inspired by liberal prizes for excellence.

Under the supervision of the Highway Agricultural Superintendent, and in connection with the Superintendent of Roads, a careful study of the whole system of roads in the town would be made, keeping in mind the relations of the same to County and State roads. Some rarely used highways might wisely be closed, some new ones suggested and others straightened or otherwise improved, so that the generations to come would find that the science and art of our times were faithfully applied. It may be that a broad-minded scheme might be adopted by the township for a generous widening of the roadside areas, especially where ancient plans seem to be too cramped. Cordial co-operation on the part of the land-owners would help immensely to accomplish the end sought.

But long before all this could be accomplished, and even if none of it could be undertaken at once, the High-



WALNUTS FOR SHADE

These comfort-giving trees are planted along a roadside in Michigan.

way Superintendent could get at work. Undesirable trees and shrubs along all the township highways should be cut down and sold for lumber or firewood, or be burned, especially where destructive insects are at work. All good trees should be properly trimmed and doctored, so as to give good chance for growth. Three kinds of

trees should be set out, wherever available places can be found.

(1) Purely ornamental trees would be the first thought of as in harmony with all former ideals. Already much has been done at this by our forefathers as they obeyed the injunction,

"Woodman! spare that tree!" or have set out stately rows of elms, ashes, maples, locusts, poplars, horsechestnuts or evergreens of various species. Local encouragement might easily increase this sort of planting and wise suggestions might improve roadways from an artistic standpoint. But the planting of ornamental trees would be fostered continuously by the Highway Superintendent, with variety as well as quality always kept in mind. Sometime trees will be planted for their form and elegance, like the American elm as distinguished from the "swamp elm" or even the English variety. Again mass of foliage and density will call for the horsechestnut and the maple. Some will be set out for their flowers. The famous cherry tree of Japan is cultivated not for its fruit, but the season of its blossoming is made a public holiday.

(2) A second most important type of tree to be cultivated on the roadside is the nut variety. Here much will depend on climate and soil. No inferior nut tree should be allowed to grow along the roadside, except for



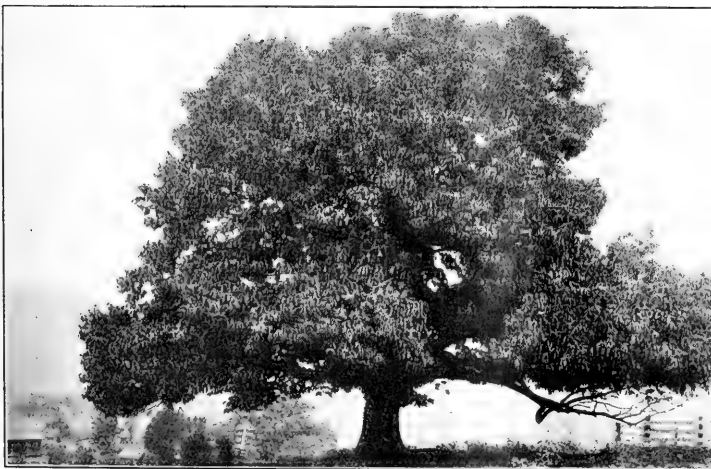
A BEAUTIFUL AVENUE OF TREES LINING A ROADWAY

These magnificent trees are California black walnuts, and the planting is at Rancho Chico, California.

ornamental purposes or for value of timber. High grade hickory trees would prosper in certain districts and could be planted along the roadsides by the tens of thousands. High grade hazel nuts, black walnuts, butternuts, chestnuts (where the blight has passed entirely by) as well as hardy exotics like the English walnut and the pecan. I put in a plea for the much neglected beechnut, provided the quality can be of the best. The tree itself is highly ornamental and should be set out by the thousands in localities adapted to it. In Europe long lanes of beech trees are famous. The Highway Superintendent would

be on the watch for new and highly flavored and hardy nuts, and be quick to secure all improved and adaptable species. He should not be afraid of experimenting with unknown quantities, on occasion. Nut gathering week should be a public holiday season. Up to that time the school children have been the special guardians of the nut trees and on the week designated should help gather the public crop on shares. Nut trees that turn out inferior fruit should be grown and cut for timber.

(3) But the main attention of the specialist might well be turned toward fruit culture, which would be the principal subject of his teaching in the schools. At once, on coming to his job, he will trim up and graft all strong apple trees along the



A HANDSOME CHESTNUT, FULL OF FRUIT

The chestnut bears a heavy crop of nuts each year and is, as well, a tree of beautiful contour. Unfortunately, its general planting cannot be advocated, because of the blight which is slowly but surely destroying the species. It is only safe to plant it in certain localities and then it must be watched most carefully.

roadsides, putting in the finest quality of graft. He will dig up the soil at the roots and put on roadscrappings or any other available fertilizer. Then would come the setting out of marketable kinds of apples of high grade wherever the soil and situation warrant it. Many a township could absorb ten thousand Baldwin apple trees with a good grade of peach in between, to be thinned out as the apples grow. Other varieties of apple, as well as pear; cherry, plum, quince, and, to a limited extent, grapes could be added, especially those for canning purposes. Fruit trees can be raised along the highways to the limit of the powers of cultivation and spraying and marketing. When once farmers can see the advantage to them they would be ready to cultivate on shares the trees along their farms in the roadside. By a plan of careful selection, marketing only apples of superb quality a town might get a national reputation for its fruit and command a superior price. All but the best of its fruit could be used at home in a dozen ways almost as valuable from the monetary standpoint. The question of small fruits, such as high grade raspberries and blackberries and blueberries might be taken up and many otherwise barren spots be made beautiful and fruitful as well.

The writer is assured in his own mind that here is a practicable way of adding to a perceptible degree to the wealth of the world, saving waste at least, and furnishing a valuable life work for thousands of intelligent men and women. Indeed women might assume the direction of many phases of this work as well as men. Community leaders along this line would have an enviable opportunity. The educational side of the undertaking is most important and would help bring forward a generation full of big ideas. The plan adapts itself to many new phases of activity, such as the Boy and Girl Scouts, the County Y. M. C. A. development. Let one township do the thing effectively and others are bound to follow so healthful and fruitful an example. The specialization involved in the plan would bring a unity to the rural life of the community and develop many unexpected values to the town.

A SIMPLE WAY TO DESTROY CATERPILLARS

BY EDWARD P. SPERRY

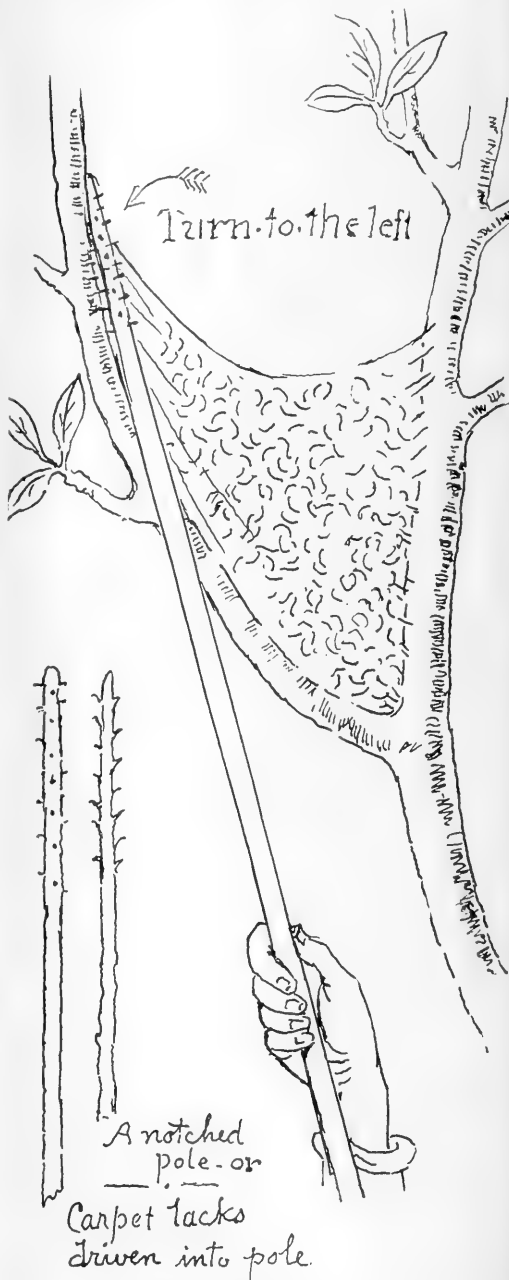
CATCH the web at its highest point. Turn your stick slowly allowing it to rest gently against the branch.

Keep turning your stick down to the crotch, then ascend the other branch to the limit of the web.

The entire web with every caterpillar imprisoned in the web, is on the end of your stick to be plunged into any liquid that will kill them.

Burning out nests frequently harms the bark.

By the method described, one can destroy three or four webs in the time it takes to burn one besides the trouble to renew rags is obviated.



THIS IS THE DEVICE

A rake handle, with carpet tacks driven in to protrude about a quarter of an inch, or, a natural stick notched by a pocket knife, as shown in the cuts.

PROTECTING BIRDS AS AN ACT OF PATRIOTISM

BY MOODY B. GATES

*"The birds—that make sweet music for us all
In our dark hours—as David did for Saul."*

IN THE general endeavor to win the war attention has not been centered so much on particular ways and means as on general results. Nevertheless many things have been done which will loom up large in the perspective and which it will take the restored normality of peace times to value at their full worth.

Prominent among these is the remarkable stride made within the past year in the direction of establishing bird sanctuaries throughout the nation. This development demands recognition, marking as it does a very forward step in a much needed direction and showing results which indicate that a firm foundation has been laid on which to build along similar lines.

Above other things, it indicates that under sufficient impetus our people are always ready to take up and push forward any humanitarian or conservation project of which the benefit is clearly pointed out by those having no selfish aims or ambitions to serve and who take up reforms simply for the general good. This work in no way conflicts with the splendid achievements of the Audubon

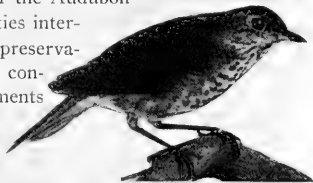
and other societies interested in bird preservation. On the contrary it supplements and makes effective the educational work which the other organizations have done and

are doing. In the case of the remarkable record herein described it is apparent that wonderful results are to be obtained by simple, direct, educative appeal. This showing of one million acres of land voluntarily pledged for bird sanctuaries and distributed throughout the entire country and over the boundary line in Canada is a tribute to the power of editorial influence, not only in bringing about tangible results, but in paving the way to giving legislation its maximum effect. In the space of only a few months, more concrete results in establishing private bird sanctuaries have been attained, than ever before in a like period of time. One can readily imagine the results if all national publications were to join hands in this or in a similar constructive work for Wild Life Conservation, Forestry, or anything else of public benefit.

When the United States entered the war and the question of food for our soldiers and those of our Allies became of paramount importance, *The People's Home Journal* began a campaign of education among its readers; first, to teach the value of birds as protectors of growing

crops, and, second, to put this knowledge to practical war work account by appealing to patriotic impulse. The necessity was pointed out of saving the birds from wanton attacks and encouraging their increase by affording them protection from hunters and guarding them as much as possible from their natural enemies as well as from extremes of weather. Volunteers were called for, to pledge their land holdings as safe nesting places and to furnish a supply of food for winter birds which perish in multitudes in time of severe sleet and ice storms.

To make the effort systematic and effective, the establishment in every district of a great number of bird sanctuaries was urged. Owners of farms and wooded tracts were asked to sign pledges that they would forbid hunting on their property and would conspicuously display the sanctuary notices furnished to every signer of the pledge. This campaign has resulted, up to October 1 of last year (1918) in 3,379 separate tracts of land having been voluntarily set aside as sanctuaries for birds, and posted as such. The land thus dedicated comprises a total of 933,975 acres scattered through forty-two states and Canada. The signing of pledges still continues and the total



Photograph by Brown Brothers



THREE VARIETIES OF THRUSHES

None but thoughtless youngsters would shoot beautiful warblers like these or desecrate their homes, yet thousands of nests are robbed every year.

acreeage is steadily growing. The appeal to adults was further supplemented through "The Green Meadow Club," a department edited by Thornton Burgess to interest younger readers in nature study and the protection of wild birds and animals. A special appeal was made to the members of the club, through this department, to devote their energies through the summer to obtaining pledges for bird sanctuaries. Juvenile readers were shown that in furthering this important work they were performing a war service no less than were their older brothers in France.

That the youngsters took up the work in this spirit was shown by hundreds of enthusiastic letters. A Wisconsin boy wrote that he had taken the place in the field of an older brother who was in khaki, and in addition was devoting all his leisure hours to urging neighboring farmers to sign sanctuary pledges. A school girl from the same State who lived in a thinly settled district, walked and rode many miles daily, visiting distant farms, till she had secured pledges for an even hundred tracts and

tacked up the sanctuary signs. This record was even exceeded by another girl on a Montana homestead who, after covering her own district on horseback, persuaded her father to take her in the motor to far distant sections. Her efforts resulted in more than fifty thousand acres being pledged as sanctuaries.

In urging the establishment of sanctuaries, the aesthetic value of birds was not ignored nor the pleasure to be derived from the beauty of their plumage and the charm of their song; but the big emphasis was placed on the practical and patriotic argument that the protection of birds was part of the universal effort to win the war, and that the protection of birds meant bigger and better crops and more food.

It was shown that but for the efforts of birds, insects and weeds would in time make the profitable growing of garden crops an impossibility. Figures compiled by government investigators were quoted to show the enormous numbers of weed seeds and insects eaten by the quail, robin, bluebird, flicker, nighthawk, meadowlark, and all the more common birds of the American fields and woods. The fact was emphasized that such birds as owls, hawks and crows, which ordinarily have an evil reputation, largely because they are songless and plain of plumage, are indispensable as destroyers of field mice and other pests that destroy and damage millions of dollars worth of food annually, the total destruction of farm products in a single year having been estimated at nearly a billion dollars.

The results achieved from the start and the enthusiastic response were so notable that the attention of Mr. Herbert Hoover was attracted. In a letter to *The Journal*, commending its work, he said: "I hope the people of the United States will be made to realize how closely related to this whole question of food-saving is the protection and encouragement of insectivorous and migratory birds."

Dr. William T. Hornaday, head of the New York Zoological Park and managing director of the Permanent Wild Life Protection Fund, an organization for the protection of the nation's wild life, thought so highly of this sanctuary movement that he caused the fund to offer its exceptional gold medal as an added incentive for the workers. At the end of the 1918 campaign, Dr. Hornaday was so greatly impressed by the marvelous results achieved that he recommended

that the Permanent Wild Life Protection Fund award four gold medals instead of one, thus signaling the importance of the results achieved. The encouraging aspect of the situation in its broader outlook is that the sanctuary plan, while it won the enthusiastic support of the youngsters from the start, received its most effective support from

thoughtful men and women who recognized it as an opportunity to

establish bird conservation as a permanent popular movement of which future generations could feel proud. Among the thousands of sanctuaries obtained, there were many of one acre, and they ran all the way from that up to one of fifty thousand acres in New Mexico.

Many ministers preached sermons on the subject and delivered speeches at State Fairs and gatherings of farmers. One minister actually spent \$147 of his own money to secure pledges and succeeded in signing up 65,268 acres in seven counties in West Virginia. Another minister in Pennsylvania signed up 72,932 acres as a result of his personal enthusiasm. Each of these clergymen was awarded a gold medal by the Permanent Wild Life Protection Fund. In the heart of a big game country, Saskatchewan, Canada, a game guardian was inspired to take up the sanctuary work and succeeded in securing 37,745 acres posted for bird protection under no small difficulties.

The whole campaign has shown that the work was made far reaching and effective as a result of appealing strongly to the popular mind through the columns of a magazine. Many schools in the various States took up the work and in this way the movement was given an impetus which will not be allowed to die through neglect, now that it has had such a favorable start.

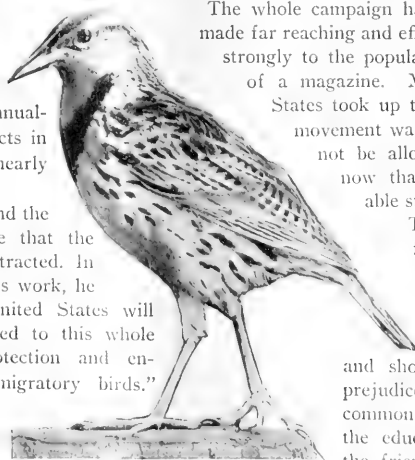
The sanctuary workers often found their task far from easy. First there was to be overcome the well established belief among farmers that birds destroy crops and should be exterminated. This prejudice, while not at present so common as a few years ago, thanks to the educational work carried on by the friends of birds, is still strongly enough entrenched to cause much resistance. An even greater handicap was the objection of hunters to giving up their sport. Many property

owners were ready enough to bar other hunters from their property but wanted to reserve the right to hunt on their own preserves. Any property owner who insisted on this right was not accepted as a sanctuary signer.



Photograph by Henry Hill
THE SPARROW HAWK

One of the most useful of birds. It destroys large quantities of field mice as well as a great variety of the larger insect pests but is a showing mark for the man with a gun.



Photograph by Brown Brothers

THE MEADOWLARK

It devours vast quantities of the white grubs which attack the roots of growing crops. Fort-seven cotton ball weevils were found in the stomach of one lark.

In view of the world shortage of food, this bird sanctuary campaign will be urged more strongly than ever the coming summer. Already the subject of bird sanctuaries is no longer new in millions of homes and the way has been well paved for further propaganda along this or other educative lines for the conservation of wild life in its various forms. The bird sanctuary movement will be kept up and carried on with zeal and enthusiasm until the whole country is thoroughly converted to the necessity of bird protection.

The whole campaign has been conducted along broad lines. The right of the sportsman to enjoy his favorite recreation wherever game is sufficiently plentiful to allow of pursuit, governed by the ethics of true sportsmanship, is fully recognized. There has been no desire to antagonize the true sportsmen, but rather an effort has been made to enlist their co-operation. Thus when a land owner has refused to make his property a sanctuary unless shooting thereon was to be permitted during the open season, that land owner's attitude has been respected and effort has been concentrated on others in that vicinity who have no such objections.

The whole theory underlying the campaign is the need of individual farms or areas of land adapted to bird life, scattered through every district, made into sanctuaries as breeding grounds for game as well as for the strictly insectivorous birds. It has been pointed out



Photograph by Brown Brothers

THE CATBIRD

Ants, beetles, caterpillars and grasshoppers constitute three-fourths of its food. Its vegetable diet is obtained from the berries of wild vines. Poison ivy and sumach are a part of its diet.

to sportsmen that such sanctuaries will, in years to come, mean more and better sport. The overflow from these sanctuaries is bound to stock the remainder of the country.

While there have been some very large sanctuaries established, notably one of 50,000 acres, stress has been laid on the value of the small sanctuary of only a few acres and the advantage of securing as many of these as possible. A large number of small sanctuaries is of greater value than one or two very large sanctuaries because of the greater number of people immediately interested. Ten sanctuaries of five acres each means the immediate personal interest in the movement of ten families, against the interest of only one family in the case of a single sanctuary of fifty acres; thus an effort has been and is being made not only to secure as large an acreage as possible but to interest in the work as great a number of people as possible.

Taking it altogether the lesson to be learned from this preliminary crusade for nation-wide bird sanctuaries is that the people of our country can be depended on to respond liberally and enthusiastically to any practical conservation movement or constructive reform affecting the general good when the object is made sufficiently clear to them. Continued educational work such as has been done in this instance should be taken up by our national magazines and extended so that other national interests, which need only intelligent direction, may be crystallized into permanent constructive action.



Photograph by Brown Brothers

THE CUCKOO

Much given to eating the large hairy caterpillars which live in colonies and are most destructive to leaves of trees and plants.

MAJOR D. T. MASON, recently returned from military service abroad, is doing special work in the Treasury Department, at Washington. The Bureau of Internal Revenue, finding difficulty in administering the Income and Excess Profits Tax law with regard to the so-called "Wasting Industries," has turned to men

familiar with forest industries, as many of operations involved include mining, gas, oil and those dependent upon the forests for their raw material, and Major Mason, with the title of "Forest Valuation Expert," has been placed in charge of the organization of this work.

WALKS IN THE WOODS

(III) WITH WASHINGTON IRVING ALONG THE CROTON AQUEDUCT

BY J. OTIS SWIFT. AUTHOR OF "WOODLAND MAGIC"

(PHOTOGRAPHS BY THE AUTHOR)

THE warming sun entices us forth this spring morning for a walk along the top of the Old Croton Aqueduct from Hastings-on-Hudson to Tarrytown. The Aqueduct was built many years ago to supply New York City with drinking water. It has long since become an integral part of the landscape. It skirts the

of the path one may look, these spring evenings, straight down the river past the Palisades, and see the myriad twinkling lights of Manhattan, it is for the most part a secluded country lane, fenced, and dashed here and there with weirdly fantastic and lovely scenery.

We go down through the garden here at the Manor in Hastings, past the big white oak guarding the upper end of the little ravine where the Americans lay in ambush to surprise the Hessians at the Battle of Edgar's Lane, in the Revolution. We come out on the Aqueduct at "Locustwood," the old Minturn estate, now the home of Major Frederick G. Zinsser, where tradition says that Louis Napoleon was once a guest and where Admiral Farragut, who lived on the other side of the village at a later date, was often a visitor.

The fine colonial mansion, back from Broadway, is bowered among mammoth horsechestnuts that are glorious in blossom; white pines that may have souged above the heads of Colonial troopers; two beautiful old English lindens brought over and planted here by the early Minturns; one of the most



LOOKING UP THE AQUEDUCT
NEAR THE GOULD ESTATE

eastern bank of the Hudson for many miles, paralleling Broadway, the ancient post road that stretches from the Battery in the city to the Capital at Albany.

It meanders through the most historic region near the metropolis, and for eight miles through what are perhaps the richest private estates in America. It is a level stretch of grassy banks bordered most of the way with giant old forest trees. It is the easy path of communication between sleepy villages of the Hudson Valley; the Lovers' Lane where Darby and Joan saunter hand in hand on summer evenings, with none to see save the sympathetic moon. It winds through a country made famous by Henry Hudson, Washington Irving, George Washington, Rochambeau, and incidentally by Major Andre, the British spy. Though from picturesque turns



WASHINGTON'S HEADQUARTERS, AT DOBBS FERRY, WHERE HE PLANNED THE YORK-TOWN CAMPAIGN

imposing copper beeches in all the Washington Irving country; locusts from which the old place gets its name, and many other interesting trees.

A sanctuary of trees, shrubs, and wild birds, are the private estates along the Hudson. The patient hands that planted these whispering giants are dust, but the blessings bestowed by them go on from generation to



TULIPS AND SYCAMORES BESIDE THE AQUEDUCT

generation. Just before we reach Dobbs Ferry where Richard Harding Davis' hero "Captain Macklin" lived, and where is the tree-embowered home of the late Robert Ingersoll, we come upon one of the many "Washington's Headquarters" in this locality. This beautiful old manse here in the edge of Dobbs Ferry attracts us at once because of the fine spreading English walnuts, monarch horsechestnuts and big elms shading the lawn and flower garden. Comfortably dozing away the years it sits beside Broadway brooding over the Tappan Zee glistening in the spring sunshine to the west. Mr. Messmore Kendall in recent years purchased this one-time home of Peter Van Brugh Livingstone, of a famous colonial family, and restored it as a patriotic duty and as a home for himself. Here Washington planned the Yorktown campaign. Some of the walnut trees were planted, it is said, by Washington while he used this house as headquarters. One of the walnuts is directly in front of the house, shading Broadway; one at the south entrance to the grounds, and two back of the house near the Aqueduct and the little buildings that were the slave quarters. There are Norway spruces, black cherry, oak,—and an ancient wisteria clammers over the porches about the doors and windows, with their beautifully hand-forged iron hinges and fixtures. One wonders at the craftsmanship of the blacksmiths and locksmiths who forged the doorlatches and locks of these old homes. What has become of the craft? Rest assured that the character hammered out on their anvils has come down the centuries making safe the government they helped to establish. Just beyond Dobbs Ferry where stood the

Indian village of Weckquaskeek at the mouth of the rivulet called Wyaquaqua, the Aqueduct embankment, winding regardless of village topography, crosses a deep ravine wherein is a happy little brook laughing down from the ridge of hills to the east, tinkling its way through the park of the country home of Edwin Gould. The big house sits on the bank above the river to the west of the Aqueduct, and its winding drive from Broadway follows the north edge of the dell. The ravine itself is a bit of natural woodland in the heart of extensive parkage. It is locally historic, for from the point where the brook slips into the shining Hudson not far from where the shell heaps of the aboriginal village of Weckquaskeek, up through the heavily forested gully, used to wind the trail of the Mohican Indians who passed this way from their canoe landing on their return from the summer hunting grounds up-State to their winter village in the Nepperhan Valley.

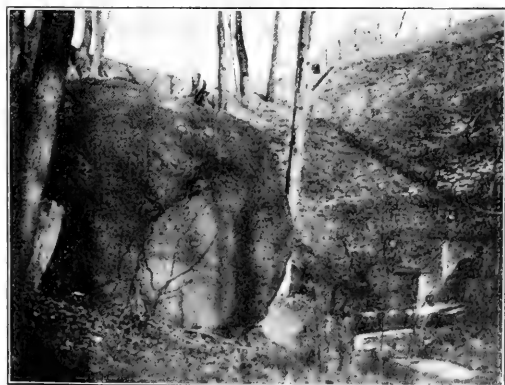
As we look down into the ravine through the tops of giant old tulips and white, ivory sycamores, we can picture the dusky tribesmen pausing beside a great boulder dropped from the bottom of some grinding glacier. We see the shadowy warriors lounging about, smoking their long pipes while the black-eyed, red-bronze cheeked squaws made a fire with sticks and expose to the heat such trout and salmon as these enthralled brooks have not known for nearly three centuries.

There is a picturesque mystery about these bits of forest hidden among millionaire estates on the Hud-

son, that reminds us of the legends of Sleepy Hollow, and those older and more intimate tales told by imaginative



"LOCUSTWOOD," AT HASTINGS-ON-HUDSON



A BOULDER DROPPED FROM THE BOTTOM OF SOME GLACIER, IN RAVINE ON EDWIN GOULD'S ESTATE

nurse maids, of queer Little People,—fays, naiads, wood-gnomes, who come out of their fern-hidden grottoes on moonlighted nights to play pranks with the sleepy gardeners and ride the backs of flying squirrels among the shadow-haunted, limb-crossed sky spaces in the tree tops. It is hard to believe that all this lovely wilderness of brake, azalea, wild roses, ferns, mossy banks and hidden dells isn't inhabited by some tribe of Little People who stole their passage over in the cargo of the Half Moon, and now keep the rotting stumps decorated with bright-hued fungi and the gray stones painted with lichens.

Sit down on the sloping bank of the Aqueduct by the brook any moonlit summer night and up from the tangle of blackberries, Benjaminbush, and black cap raspberries in the ravine will come the music of orchestras of cicadas and crickets, playing wild unearthly little tunes for the nymphs of the brookside to dance to. And if you look close enough, down by the flat rock where the smooth black water pours over like melted glass, you will see—but perhaps the smoke and dust of houses has dulled your eyes, and you will not see anything! So what's the use?

As we go up the Aqueduct white-bibbed Peabody birds entice us to inspect the hedgerows and trees, and a yellow-hammer calls off somewhere down by the river. The next place in this neighborhood where Washington is said to have made a more or less protracted stay is the old Schuyler estate, now the International Garden Club's country house. If you ride up Broadway from New York you'll be attracted about here by a wonder-



THE AQUEDUCT, CROSSING SUNNYSIDE LANE.

ful row of great old sycamores lining one side of the roadway, some of them nearly three feet thick at the base, reaching up their gnarled, mottled brown, green, gray and white trunks to massive ivory arms leaning over the sidewalk. The estate was one of the properties of the family of General Philip John Schuyler, the father-in-law of Alexander Hamilton. The imposing great house down beyond the Aqueduct is surrounded by lawns dotted with weeping-willows, English walnuts, white pines, sycamores, locusts, horsechestnuts and a few magnolias. On a lawn just beyond Irvington-on-Hudson we come upon a Maidenhair tree, *Salisburia adiantifolia*, the Ginko tree of Japan and China, which is to be seen on many of the streets of Washington.

The tree folk that most impress us on our walk, though, are the sycamores, everywhere standing out in

the landscape because of the snowy whiteness of the massive arms, these early spring days, that they stretch up to the skies as if to welcome their lover, the South wind. These Occidental plane trees are the cousins of the Oriental plane trees of Turkey and Greece, under which the ancient philosophers used to gather their students about them. There are beautiful specimens of the Oriental plane tree on the Thames Embankment in London and on Riverside Drive in New York, though the latter are young.

On the bank of the Aqueduct just before we come to Sunnyside Lane, above Irvington, a shaded and shrub-bordered roadway running down from Broadway to the rambling old home of Washington Irving at the river, we detect a faint fragrance beside the path. Stooping, we find the grass roots closely interwoven with wild thyme—and our hearts sing with Shakespeare:



LOOKING DOWN SUNNYSIDE LANE TOWARD IRVING'S OLD HOME

"I know a bank where the wild thyme blows, Where oxlips and the knodding violet grows, Quite overcanopied with luscious woodbine, With sweet musk roses and with eglantine. There sleeps Titania sometimes of the night, Lulled in these flowers with dances and delight."

The big yellow poplars, shagbark hickories, black birches, and cherries of Sunnyside Lane are dotted here and there with bird houses—the spirit of Irving, who received Louis Napoleon as an exile at his cottage on the Hudson, and who loved wild birds and speculated about their habits, we may believe, fully as much as he did about the spring the old Dutch woman brought over from Holland in a churn, seeming still to linger about the place. There is a cheerful little brook that babbles down through the Irving estate from Broadway past a spring near the Aqueduct, and, there being no taste of buttermilk, we stop to drink. Then we keep on up the path and come, just below Tarrytown, to where the Aqueduct cuts straight across the lawns of "Lyndhurst," the magnificent and beautiful estate of Mrs. Helen Gould Shepard—soft velvety lawns these spring days, and a little later we are entering the picturesque village of Tarrytown where, on the hills above, is the home of John D. Rockefeller, and, to the north, Sleepy Hollow, the little valley made famous by Washington Irving.

PHYTOPHOTOGRAPHY--OR THE SCIENCE OF PHOTOGRAPHING FLOWERS

BY R. W. SHUFELDT, M. D., C. M. Z. S., ETC.

(PHOTOGRAPHS BY THE AUTHOR)

IN SECURING photographs of flowers, to obtain the very best results one should be expert at photography in that special line; and, what is equally important, one should employ in the work the very best materials available, including the various modern appliances for taking color into consideration. It is most essential that one should have a thorough understanding of ordinary photography, supplemented by a familiar knowledge of flowers and their habits of growth, in order to make a success of phytophotography.

There is no line of flower study—and there are many of them—in which the photographic camera cannot be used to the greatest advantage. This is especially true when we embrace the entire subject of general botany in the statement; for the photography of a tiny flower requires a very different kind of experience as compared with what is demanded in making photographs of trees, be the latter for artistic or for scientific purposes.

In such pursuits, we have in one field all that pertains to the science of micro-photography of flowers, in which we aim to pictorially illustrate the intimate structure of all the parts of trees and plants of every conceivable de-

scription. With this department I shall have nothing to do in the present article, nor will the question of the photography of trees be entered upon here; that is a subject which

will be taken up later on as one having especial interest for the readers of AMERICAN FORESTRY. Studied in the gross, where the subjects admit of it, the camera may be used to depict the special parts of a very large number of species of plants, and the aim is to exhibit the comparative form of the seeds, the roots, stems, leaves, blossoms, and much besides; but this most important field will likewise be passed in the present connection.

Then we have the artistic photography of plants and flowers, including all departments of botany. A volume might easily be devoted to this branch of phytophotography, as the subject is as far-reaching as the range of plant-life itself. Floral designs, as we know, are used throughout the entire realm of art, in all of its branches, and the use of the camera here is of the greatest aid and importance.

Some half a dozen other well defined lines of photography, in their relation to botany, might be pointed out; but the one to be touched upon here is quite



FIG. 1—BLUE VIOLETS, NATURAL SIZE, TAKEN AS THEY GREW



FIG. 2—FIVE BLOODROOT PLANTS TAKEN *in situ*, GROWING AT THE BASE OF AN OAK TREE



SEVERAL PLANTS OF THE TINY WHITE VIOLETS

Fig. 3—Taken in the studio with indirect sunlight from one window and with reflected light from a white surface. Made-up surroundings, with a smooth surface of pine for background.

different from any of the ones named above, and it appeals particularly to those who spend much of their time in the field and forests of the country, to those who frequently have the inclination to photograph our wild flowers.

This work may be undertaken either indoors or in the open, and in the latter instance the flowers or plants to be photographed may be taken *in situ* or otherwise. When photographed in the studio, there are many points to be considered, any one of which, when disregarded, may lead to failure. For example, in the first place we are confronted with the problem of proper lighting; and in addition to this are matters of suitable backgrounds for different specimens, of correct posing, of maintaining the original freshness of the specimens,

and the securing of detail and related values. Almost every specimen demands different handling, and we can well imagine that the number of specimens is practically limitless. This likewise applies to the conditions under which one works with respect to surroundings—indoors or out, to equipment, to climate, to the part of the world one may be in, and so on. Seasons also play their part, as well as the time of day. Further, it is a very different matter to photograph flowers out-of-doors in a swamp in the torrid tropics, than it is to attempt the same thing in the case of plants growing in the barren grounds of some subpolar region, or within the entrance of some cave or cavern in any part of the world. What will be dealt with in this particular are some of the ordinary problems of phytophotography, such as we may be confronted with during the spring and summer months in the north temperate parts of the United States.

First we may consider one or two examples of out-of-door photography of flowers and the lessons they have for us. There are at least three things to be borne in mind, and one of these consists in the choice of subject; then the matters of background and lighting are to be taken into consideration. Turning to Figure 2, we have five average Bloodroot plants in a group; they were photographed precisely as they had grown, and without the slightest disturbance of their surroundings. These flowers are not as perfect as they are sometimes found to be, while their leaves—in the first stages of growth—are both interesting and instructive; so much for our choice of subject in this instance. Now, as bloodroots are, in a very large number of cases, found growing at the base of some big tree, the picture in this particular is practically perfect, as no finer background could be chosen than the rough, gray bark of the oak here shown. Had this photograph been made on a moderately gray day, the result would have been perfect in so far as the lighting is concerned; but it was obtained on a very bright spring morning, in the full glare of the sun, and as a consequence nearly all detail of the delicate struc-



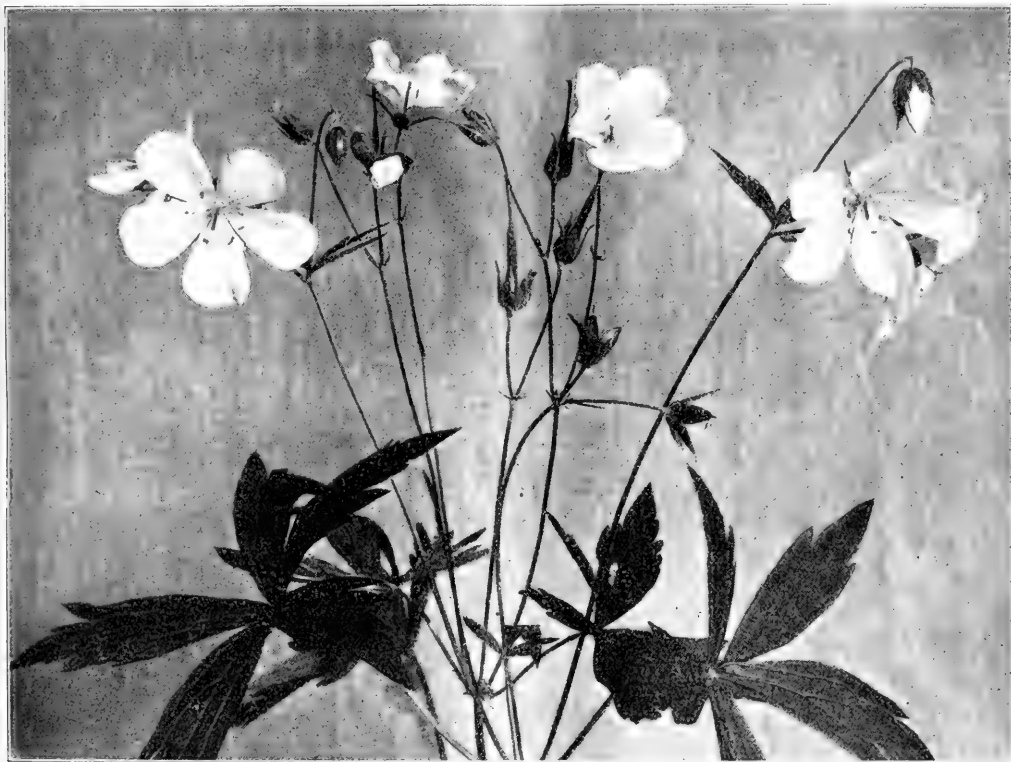
WILD GERANIUM OR CRANE'S-BILL PLANTS. BUDDING AND IN FULL FLOWER

Fig. 4—Taken *in situ*. Left side in semi-sunlight, right moderately shaded. Background of woods beyond. Small stop and several seconds exposure. Reduced one-third.

ture making up the central portion of each flower is entirely lost. This defect could have been easily overcome by someone holding a large, open umbrella at the right distance above the plants, so as to produce the proper amount of shadow for them; this may be done either by the operator or his assistant. If the former does it, he should have a least eight or ten feet of tubing to his shutter, in that he may stand in a place where the requisite shadow can be thrown, not only to include the plants but for a considerable distance about them.

On "gray days" no such procedure is necessary; but when photographing wild flowers in the open on such occasions, especial attention must be paid to the selec-

leaves of the plant almost entirely form the background, cutting out what is always a *most objectionable feature* in pictures of this class, namely all the vegetation in the background, which is conspicuously out of focus, notwithstanding your having used the smallest stop in your diaphragm. In this picture, where the leaves do not cut out this defect, the wonderfully deep shadows do, and this was anticipated through the precautionary study of the subject on the ground-glass. This result was obtained on a 5x8 rapid plate, with the plant natural size. A gray sky at noon tempered the light much better than an open umbrella could do, for the reason that the produced shadow or shading was general; whereas,



AN UNUSUALLY FINE WILD GERANIUM PLANT OR CRANE'S-BILL

Fig. 5—This was photographed natural size indoors with proper sunlighting. Background of smooth pine surface—buffy yellow. Flowers pale purple. Detail of minute structure perfect. With ordinary lens pollen grains may be seen on anthers.

tion of subject and background. A few years ago, when collecting examples to illustrate the present article, a big bed of the common, blue violet was selected for the purpose. After some ten or more studies on the ground-glass of my 5x8 camera, one was finally chosen, and a reproduction of a photograph made from the negative obtained is here shown in Figure 1. These flowers are of a rich violet color; but the thing to notice is that every delicate part of the structure of any of the three of them is reproduced in the minutest detail. In addition, the

in the case of an umbrella-shadow, it is deepest at the center and grows weaker toward the periphery.

Sometimes you will come across the very subject you've been looking for all day after a hard tramp, with three or four miles ahead of you before you can reach home, and just as the sun is barely above the horizon; but there is no use of thinking about photographing the tid-bit. Only one alternative is left you, and that is to take them along with you. Suppose, for example, that the specimen or specimens be a group of the most ex-

quisite little white violets; the way to do is to take them up, roots and all, in the most careful manner, and transport them to the house in some carrier in which they will not be disturbed in the slightest degree. When proper precautions are taken, this is by no means a difficult feat; and when carefully planted over night in some suitable receptacle, they will be in excellent condition for photographing the following forenoon. Now comes the task which calls for all your skill; but knowledge of lighting, natural posing, the background, and the accessories are all so well exemplified in Figure 3, that to write the matter out in detail would only needlessly consume valuable space. This result was also made the size of nature on the plate; and it is interesting to note how

suitable specimen close to your home, however, and by photographing it under the proper conditions of light and background in your studio, such a result as is shown in Figure 6 may be secured. This was made with an instantaneous six and a half by eight and a half dry plate, the subject being natural size. With a good hand-lens the most minute structures of the buds and blossoms can readily be made out—in fact, they are quite visible to the naked eye.

There is another way, however, in which such a picture as this may be made by one skilled in such procedures. It requires a perfectly clear day, absolutely no wind, and a cloudless sky. By getting up on some desired elevation—such as a hill or a house-top—where



HIGH-VINE BLACKBERRY IN FULL BUD AND FLOWER

Fig. 6—Natural size; indoors. Room highly lit by sunlight as in Figure 7. Background, smooth pine board (buffy yellow). Great detail secured throughout entire photograph. Graceful arrangement. In Figure 7 and in this one, the sun does not shine directly on the plants.

distinctly one may discern the fine, white pubescence on the leaf and flower stems. The structure-detail of the flowers is likewise most perfect, and bears examination, in the photograph, with a powerful hand-lens.

Quite frequently we will meet with some plant bearing delicate flowers, from which the petals are easily shaken, and of which we desire a natural size picture, showing all the characters of the leaves, stems, and the structure of the blossoms. Such a plant is seen in the "high vine blackberry;" and to photograph it *in situ* without introducing an objectionable, distracting background all out of focus, is practically out of the question. By obtaining a

there are no objects between your lens and the sky, the blackberry branch may be secured in some fashion so that the sky forms the necessary background, and you can focus on the desired portion of the specimen, natural size. The subject should be properly shadowed by the use of an open umbrella held above it. Considerable skill and judgment is demanded on the part of the operator in order to obtain perfect photographs in this fashion; still, it can be done, and the results, if perfect, will repay one for all the trouble they occasioned.

One of the most difficult plants to handle or to get good, natural size photographs of is the well-known wild



GIANT CHICKWEED PLANTS

Fig. 7—Taken *in situ*, natural size, during a sunny forenoon. No shading employed. Detail of most of the flowers lost. Background not attractive. Time, a few seconds with small stop. While it shows how the plants grow in nature, the general effect only is somewhat pleasing.

geranium or crane's-bill (Figs. 4 and 5). In the first place they wilt almost instantly upon being plucked. If taken up by the roots they last a little longer, though generally not long enough to have you reach home. Even under the most favorable conditions the plant commences to droop in the most aggravating way in about ten minutes, and this casts out the plan set forth in the last paragraph with respect to the blackberry branch. This wild geranium rarely or never grows where nature's background can be obliterated. Some say, why not use a white sheet or a similar white surface back of it, just where it grows in the woods? For the reason that its purple flowers take *white*, and would not show in the result (Fig. 4). A color-screen would help some, but not to the fullest required extent. Observe, too, in the case of this plant, what extremely flexible and delicate stems it possesses, and these likewise form a real menace to your success, should you attempt the photography of this species in the open, when the air is in motion even in the very slightest degree.

Now, having made up my mind not to be defeated in the matter of obtaining a perfect photograph of any small plant in existence, the same was secured of this troublesome geranium by selecting the most perfect specimen I could find in a piece of woods only a few hundred feet from my house. It was most expeditiously taken up, with a great quantity of earth about its tender roots. Placing the whole affair in a deep bucket having a little water in the bottom, and shading the plant with a newspaper, it landed in my studio in less than six minutes after it was taken up. A background was already arranged for it, and the camera was in complete readiness to make an instant exposure on a six and a half by eight and a half

rapid, dry plate. This was promptly done, and in Figure 5 we have the satisfactory result; with a lens we may observe even the fine pollen upon the minute anthers! With the exception of its roots, every structure of this plant, at this stage of its growth, is in evidence and capable of being studied.

Occasionally, the Giant Chickweed gives one trouble, as may be seen by studying the result shown in Figure 7. These plants were wonderfully beautiful as they appeared when focussed on the ground-glass; and failure seemed a thing not to be dreamed of. Yet, what do we have? Why, one of the very kind of pictures that the student of phytophotography should ever aim to escape producing. Note that the central portions of nearly all the flowers are lacking in detail, and that there are no relieving shadows for the brilliantly white petals. This defect must be overcome, either by selecting a gray day for the trial, or by the use of the open umbrella, as described above. But then, the background is too dark and unattractive, making the contrast with the flowers altogether too strong. But ah! that's another matter. Giant Chickweed is by no means an uncommon plant in the districts where it is found; and the thing to have done here was to have selected a more promising subject



TWO SPECIMENS OF JACK-IN-THE-PULPIT

Fig. 8—Spathes, leaves and other parts; natural size; indoors, in full sunlight. White cardboard background. Result perfect.

in a more favorable locality. Experience will help a great deal in work of this class, but it must ever be seconded by the most indomitable patience on the part of the photographer, in order to attain anything like success. Mind, Figure 7 is not altogether lacking in value from the viewpoint of instruction, as it not only shows the form of the flowers and the number of the petals, but also the characters of the buds, the shape of the leaves, that these are placed *opposite* each other on black, branching stems; finally, as a plant, it generally grows in masses and probably in shady places,—which, by the way, is really the case.

In the phytophotographic field we often have to deal with a class of pictures—or produce them rather—that are of a severe scientific type. These need only have a background of the most immaculate white—an effect easily produced by the use of a large sheet of white cardboard, placed behind the subject at the time of photographing it, or what is still more effective, a big sheet of soft, white blotting paper. Two things should receive our careful attention in making pictures of this class: the choice of subject and the lighting during the time the exposure is being made. As such pictures are intended for the instruction of botanical students, the subject-plant chosen should exhibit as many of its characters as possible, and the specimens should be as nearly perfect as we can find them. In posing, these structures should all come squarely into view and be seen to the best possible advantage. A very perfect example of this class of phytophotography is reproduced in Figure 8. It is of a fine specimen of our common "Jack-in-the-pulpit," collected shortly after its appearance in the early spring. Needless to say, this result was secured indoors, and with strict observance of all directions set forth in the foregoing paragraphs. The stem-sheath is beautifully

shown, as are the young leaves just emerging from it. Two fully developed "spathe" are in the picture, and their common characters are well shown in the left-hand one, which is perfect in all its parts. On the right side the emergence of flowers and leaf-stems from the sheath is well shown; some of the larger leaves are also in evidence, and the form they take on is shown quite distinctly.

If such a picture as this were used in any work of descriptive botany, it should be supplemented by one or two others, or maybe three. In a previous issue, AMERICAN FORESTRY has already published the ones referred to, and they are sections of the spathe to show the internal structure; one to show examples of the extraordinary root this plant possesses and how it varies in different specimens of the plant, and, finally, the fully developed leaves, with a picture of the ripe fruit. Our common Skunk Cabbage was dealt with in a similar fashion in AMERICAN FORESTRY, as have quite a number of other representatives of our flora of the Middle Atlantic States.

Most of our handsomest and more or less exhaustive works upon botanical science—whether general in nature or devoted to restricted areas—employ the last class of illustrations here described, and for very obvious reasons. No good student of flowers is benefited by having the pictorial side of the works he is studying obscured by hazy, dark backgrounds; faulty posing and selection of subjects; obscurity due to the matters of lighting and backgrounds, or to any other class of defects.

This contribution will not have been written in vain should it induce those making photographic pictures of flowers with the view of publishing them to take heed of some of the pitfalls that occur along the highway to ultimate success in such pursuits, upon which it has been the aim of this article to throw a little helpful light.

AT a recent meeting of the Board of Regents of the University of Washington, the name of the College of Forestry was changed to College of Forestry and Lumbering. While the term forestry, when viewed in its broadest sense embraces lumbering, the work at the University of Washington has broadened out so as to cover practically every phase of the lumbering industry, and in this respect differs from practically all other forest schools.

In addition to the work ordinarily covered in the forestry curriculum, Washington offers opportunities for specialization in general forest products, logging engineering, and the business of lumbering, the latter including new courses in milling and marketing. Expansion along these lines was necessary to meet the needs of the industry in the Pacific Northwest. The courses in logging engineering and forest products have now become thoroughly established and won recognition in the industry to the extent that the demand for the graduates, particularly in logging engineering, has far exceeded the supply. It is expected that the same will be true in the course covering the business of lumbering as soon as this becomes well established.

A PROCLAMATION creating the Alabama National Forest has been signed by the President. About 10,500 acres of public lands, in Lawrence and Winston counties, in the northern part of the State, which had been withdrawn from entry, are included in the new National Forest. In addition the Government has purchased approximately 12,000 acres and has options on an additional 13,000 acres in the same locality. It is expected that, by further purchases, the Forest will eventually be enlarged to include about 150,000 acres.

ON APRIL 3 and 4, at the New National Museum at Washington, District of Columbia, was organized the American Society of Mammalogists. The policy of the society will be to devote its attention to the study of mammals in a broad way, including life histories, habits, evolution, palaeontology, relation to plants and animals, anatomy and various other phases. The society will publish the Journal of Mammalogy, in which popular as well as technical matter, will be presented.

FORESTRY AS A VOCATION

BY H. H. CHAPMAN

WITH the return of nearly two million young men from the trenches and the varied activities of military life in France, comes a heightened interest in forms of outdoor employment. The appeal of forestry as a vocation has always drawn a class of young Americans whose love of the woods and of the hardships of the trail is combined with a desire for public service for scientific achievement, and for clean, practical effort.

Probably no profession holds a greater lure for those who rebel against the confinement of indoor occupations and have a genuine love for the woods and mountains, yet no calling is so little understood in America today as this modern vocation of forestry.

Forestry is the art of maintaining forests for the benefit of mankind. It is, first and foremost, a *land* question, for forests are the product of forest soils. Since forests as such must occupy land to the exclusion of agricultural crops or of fruit trees, forestry is based on the proper segregation of lands into the two fundamental classes, agricultural lands and forest lands. The forester's vocation usually excludes agriculture, but he is frequently called on, in co-operation with agricultural and soil experts, to conduct these land classifications. For this reason, a knowledge of farming is of great value to the forester.

The status of the land once determined, the forester's object is so to manage these forest areas that the greatest possible sum or combination of benefits may accrue to the communities dependent on them. These benefits are threefold. First, may be mentioned the use of the forest for recreation. This use has the widest appeal to sentiment, and is invaluable for maintaining health of body and mind for our increasing population of city dwellers. Areas set aside *exclusively* for this use are known not as "forests" but as parks, and while the forester as such can perform invaluable services in protecting the forest from fire, insects, diseases, and other enemies, he cannot here bring into play the full exercise of his abilities, for this includes the cutting and utilization of timber which is usually prohibited on such areas. The care and preservation of game, a specialty in which the forester is profoundly interested, will find its fullest development on large park areas.

The second great benefit from forest areas is the protection they afford to our soils and water supplies. Perhaps this is the best-known and best-understood function of a forest cover. In maintaining the flow of springs, in preventing the erosion of surface and the silting up of rivers, in reducing floods and prolonging the flow of streams in dry periods, the maintenance of forest cover is essential. Here, again, the forester's function is the protection of existing forests. But both in parks and protection forests there is the frequent necessity of re-establishing by artificial means the forest cover on slopes denuded by fire or by destructive lumbering. In this

latter role the forester must be a tree planter and must get his results, not as the ornamental nurseryman does, by pampering the individual plant, but on a large scale, with small stock, at minimum expense, and in competition with such destructive forces of nature as drought, wind, insect pests, rodents, frost, snow, and grazing animals.

But the real art of the forester lies in the management of the forest for the continuous production of wood in all its forms. Wood must serve us in many capacities, such as for fuel, buildings, furniture, paper, vehicles, and so on in an ever-widening circle. It cannot do so unless trees are cut, logged, transported, manufactured, and laid in a finished form at the door of the consumer. The cutting down of mature forests is necessary to the comfort and well-being of the very individual who declaims against this destruction because of his sentimental regard for the forest in its natural state. The lumberman has built up an enormous business whose exclusive concern is to supply the economic demand for wood products by taking from the forest the raw product of nature, the mature tree, and converting it into lumber from which by other processes finished products are made. It is not the business of the lumberman, as such, to do more than this. And as long as the supply of virgin timber holds out in America, the lumberman will continue to draw upon it as if it were inexhaustible. His business *begins* with the felling of the tree; the forester's business, as such, sees its completion in the same process. Forestry precedes and underlies the lumbering of the future. The true business of the forester is to grow the timber which ultimately finds its way into the economic life of the nation. Just as one agricultural crop must be harvested before another is grown, so a mature crop of trees must be cut before a young, vigorous second growth can appear. The forester's art is so to cut this timber that the forest will reproduce the most valuable species. Only by accident does this result occur naturally, following the operations of modern logging, and it never happens more than once on the same site. The worthless brush and forest weeds which spring up so frequently on old cuttings have about as much resemblance to commercial forests as thistles have to wheat. They are both green in season! Not that the lumberman can not manage his lands as forests should be managed if he sets out to do so, but that he too often has no interest in the land itself except to get rid of it as soon as the mature timber is cut. He owns it in order to assure to his business an early supply of raw material, wood.

The forester, then, is one who manages forest land for the purpose of growing trees and maintaining the productivity of the soil and of the forest. Do lumbermen employ foresters? They have need of timber cruisers to estimate the volume of their merchantable timber, of logging engineers to lay out their railroads and logging

operations, of woods foremen to superintend the logging, and of inspectors to secure close utilization of the tree. There are many openings along these lines, as well as in the milling, manufacturing, and selling end of the business, but none of these is forestry, however *essential to forestry* these operations are. When the lumberman, as a *land owner*, adopts the policy of reproduction and growth of trees, and sets out to retain indefinitely the ownership of cutover land for the possible future revenue obtainable from such management, then the forester will find an opportunity to practice his true vocation as manager of such tracts. His education as a forester may fit him meanwhile for useful employment along these kindred lines. In other words, the character of land ownership and the purpose of the owners determine whether the work of the forester constitutes the practice of his vocation or of some other line associated with lumbering or manufacturing. The men who worked in the French forests with the forestry regiments can bear witness to the truth of this statement. For over there, about half of the forested areas are publicly owned, and on the rest, the private owners have practiced forestry for decades, even for centuries; otherwise there would be no French forests! Every acre of these forests, no matter how owned, has been produced directly by the art of the forester; and the French forests saved France as truly as did the American army.

In America, due directly to our superabundance of virgin timber, private owners, as a class, could not afford and did not care to undertake the expense of producing timber; the competition with virgin forests prevented it. So it has come about that *forestry*, and employment for foresters as such, has developed principally on the National forests under the United States Forest Service, which controls 155 million acres of public lands set aside for timber production. The Forest Service employs over 2,500 forest rangers and officials of higher grade. At present, the larger number of men is taken into the Service as rangers after their passing an examination to secure Civil Service rating. This examination is given annually, in the fall, and is based upon familiarity with certain essentials of the work of a ranger, such as compass surveying, handling small timber sales, the administration of grazing for forest users, fire fighting, trail or road building, packing supplies, and making out reports. Western experience counts for much, and before taking the examination it is customary for an applicant to seek a position as forest guard, fire lookout, or "temporary" ranger during the season preceding the examination. Applications for such employment may be made to the District Foresters at San Francisco, California; Portland, Oregon; Missoula, Montana; Ogden, Utah; Denver, Colorado, or Albuquerque, New Mexico. These positions pay a salary of \$1,100, increasing by promotion to a maximum of \$1,500. Many rangers have only a common-school education, but the opportunity for *advancement* beyond this grade is largely determined, first, by the amount of additional education possessed by the rangers, ranked in order as graduates of high school, college, or

technical school of forestry; second, by their character and ability to master the work, take responsibility, exercise initiative, and become good executives. The second method of entrance into the Forest Service is by passing a highly technical examination for the Civil Service grade of Forest Assistant. This requires a complete course of training at a technical school of forestry, equivalent to a 4-year college course with one year of post-graduate work. The Forest Assistant is frequently assigned to ranger work on entering the Service. The benefits of entering the Service as Forest Assistant lie largely in the educational training obtained previous to employment. Forest Assistants are also given work in research at Forest Experiment Stations, in timber-sale administration, timber estimating, grazing inspection, and general administrative work. If they show adaptability and character, they, as well as rangers, may become Forest Supervisors at salaries from \$1,800 to \$2,400, or eventually may obtain higher executive positions paying up to \$3,600 in the District Offices or at Washington.

Certain States, as New York and Pennsylvania, which own large areas of land set aside as State forests, employ foresters. Pennsylvania educates her own State foresters at the Forest Academy of Mont Alto. New York secures hers by Civil Service examination in technical forestry.

The employment of foresters by owners of private lands will steadily increase from now on as land owners begin to realize that non-agricultural land can be made to yield an income in no other way. Paper companies, with millions invested in plants, are apt to desire a permanent output from their spruce lands, and they employ foresters to secure this end. Mining companies in regions where the supply of virgin timber is nearing exhaustion are taking an interest in forestry and foresters. Railroad corporations, driven to produce tie timber locally, are employing foresters to attain this object. Owners of large estates composed of woodland, and institutions with forest lands are realizing the need of employing foresters properly to care for their properties.

A host of small land owners exists such as farmers or owners of small estates, who can and should practice forestry on woodlots and waste places. These tracts are not large enough to justify employing a trained forester. To supply the wants of these owners, States have established forestry departments for public education in forestry, as well as to secure fire protection on forest lands. This educational work gives employment to a few foresters who have special gifts for public work, or who are needed for forest "extension" work among land owners. In addition, forest rangers are employed to specialize on fire patrol and prevention.

Finally, come the forest schools, whose business is to train and educate the foresters. Schools exist for the training of forest rangers and foremen of forest estates, which usually give a one-year course, mostly in the practical work of a ranger, such as that of fire suppression, tree planting, marking timber for cutting, surveying, and of other lines. A still larger number of college schools of forestry have been established. The recognized stand-

ard for adequate professional training is a 5-year college course based on the sciences of botany, physics, mathematics, and political economy.

The work of a forester may begin in the solitude of the wilderness, with the survey, topographic map, and estimate of timber, but it comes back to contact with men. The purpose of forest management is to serve mankind, and in working out these problems of service not merely for next year but for decades to come, the forester acquires a breadth of vision and an insight into economic laws which make for the building of character. His profession demands of him a rugged physique and ability to endure hardship, yet lifts him out of the monotonous drudgery of manual labor. No calling makes such varied demands on the individual, or so stimulates all-around development. The forester, in order to rise to the top of his profession, must be able by close observation to analyze the living forces of nature as expressed in the growth of trees and the survival of seedlings, and

must control these forces to secure the ends desired. This requires scientific bent of mind and training. He must have an intelligent appreciation of engineering problems which are often the key to the use of forest resources, and must be alive to the economic needs of communities, that he may shape the forest management to supply them. But he must also be a public leader, to secure co-operation in fire protection, create sentiment favorable to the establishment and continuance of forest policies, and secure beneficial legislation.

The foresters of America face a task which is only just begun. They have, however, shown themselves to be equal to their responsibilities, and to possess a knowledge of their common aims and ideals. Each member of this new profession strives to wrest from nature the control of her life-giving processes, and from man the recognition that foresight, conservation, and thrift must take the place of unrestrained exploitation of natural wealth in timber if our national prosperity is to continue.

FOREIGN NURSERY STOCK INSPECTION

THE main arguments of objectors to plant quarantine No. 37 are that either no pests are brought in on such imported stock or that thorough inspection abroad would eliminate any undesirable insects. There is no question but that the chief exporting foreign governments have given to their nursery stock the best inspection which human skill and science can afford. Failures are due to the human equation and to conditions not subject to change, which make inspection and certification insufficient safeguards.

The inadequacy of such inspection since 1912, when it became operative, is shown by the findings resulting from reinspection of imported material at destination in this country. Data gathered by the United States Department of Agriculture show that there have been received from Holland and Germany 3,161 infested shipments, involving 486 kinds of insect pests. Many of these intercepted insects are not known to be established anywhere in this country and numbers of them, if established, would undoubtedly become important farm, garden, or forest pests.

Under the system of inspection which has been established in the principal exporting countries there is little excuse for the passing and certification of stock infested with the egg masses of the gipsy moth or with the large and rather conspicuous leafy winter nests of the larvae of the brown-tail moth. In point of fact, however, during the period in which the highest possible grade of inspection has been enforced, no less than 52 different shipments of plants from foreign countries have been found to be infested with egg masses of the gipsy moth or larval nests of the brown-tail moth. Three of these were from Japan and the others were from France, Holland, or Belgium.

Unfortunately, these records do not necessarily comprise the total entry of these two pests. They represent merely the instances of infestation discovered by rein-

spection on this side. There is, therefore, the possibility that one or both of these pests have already gained foothold at one point or another in the United States and have not yet been discovered and reported. In this connection, it should be remembered that the gipsy moth was 20 years in Massachusetts before it was known, and this in the face of the fact that the infestation started in a thickly populated suburb of Boston.

That foreign inspection gives no real security is sufficiently shown in this record relating to two insects for which there is little, if any, excuse for overlooking.

The establishment of these two insects in different parts of the United States would soon lead to their general spread throughout the country. What this would mean in cost and damage and also in human suffering can hardly be estimated. Only a portion of the New England States is now invaded by these insects, and yet the expenditure in clean-up and control work alone amounts to more than a million dollars a year by the States concerned, in addition to aiding Federal appropriation of upward of \$300,000 annually.

An important consideration in relation to the brown-tail moth is that in addition to the actual damage to deciduous forests, orchards and ornamental plantings, the larval hairs which are shed and fill the air at the time of the transformation of the insect to the chrysalis stage have an intensely irritating or nettling character, which causes a great deal of inflammation to the exposed parts of the human skin, such as the neck, face, and hands, and this irritation, in one or two known instances, and perhaps in others, has been the cause of death by affecting the lungs and leading to fatal cases of tuberculosis. Should the brown-tail moth reach the South and Southwest this irritation to human beings would doubtless be increased by reason of greater warmth and by the moisture of the skin and consequent greater likelihood of adherence of the larval hairs.

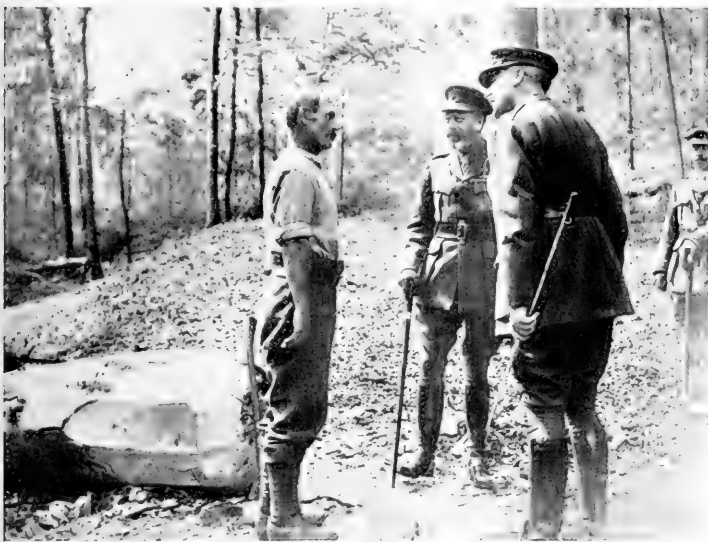
CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

THE idea of reforestation to provide for the future wood supplies of large pulp and paper industries is spreading rapidly. The Laurentide Company, Ltd., and the Riordon Pulp and Paper Company, Ltd., will plant 750,000 and 900,000 spruce, respectively, besides some pine. Price Brothers, Ltd., are starting a nursery and will make a small plantation. The Canada Paper Company will plant on a small scale. The Belgo-Canadian Pulp and Paper Company, Ltd., and the Abitibi

meeting and this bids fair to be one of the most interesting and important meetings ever held to discuss lumbering and forestry. Logging methods, slash disposal, reforestation, the diameter limit regulation, fire protection and other subjects will be thoroughly discussed. The Laurentide Company has issued a cordial invitation to the members of the Section and their guests to visit its nurseries and plantations near Grad' Mere after the Berthier meeting. American lumbermen and foresters



His Majesty, King George, congratulates a Canadian lumberjack on his uncommon skill in felling a tree.

Pulp and Paper Company are preparing their plans for an extensive planting program. No word has been received from the Pejepscot Company, which was one of the pioneers in reforestation and which has been planting at intervals for some years. If the plantations of these important companies are successful the movement will spread rapidly and will be a great benefit to the industry placing it on a more permanent basis than ever before.

The Council of the Woodlands Section of the Pulp and Paper Association have decided to accept the invitation of Mr. G. C. Piche, Chief Forester of Quebec, to hold a conference the end of June at the Quebec Government Nursery at Berthierville, about 40 miles from Montreal. He has kindly consented to let the Section have the use of the commodious building for the

are heartily invited to attend and take part in the discussions.

The Berthier Nurseries have been in operation for a number of years and have supplied a large amount of planting stock and also ornamental and windbreak trees to farmers. The Government now proposes to increase the output as soon as possible to five million trees per annum. This will make this one of the largest nurseries in the country and will enable the Government to supply limit holders with trees and also to undertake planting on its own account.

Dr. J. S. Bates, since its inception the chief of the Dominion Government Forest Products Laboratories, at McGill University, Montreal, has resigned his position to direct a research department for Price

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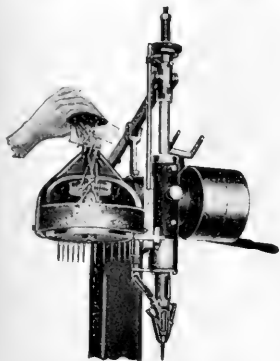


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possibilities for new products and for profits. There is also the question of the utilization of hardwood in the manufacture of paper which it is hoped will be taken up.

Don Ricardo Codorniu, who has been for many years in charge of reforestation, drifting sand work and prevention of flood damage by mountain torrents in Spain, has been elected an honorary member of the Canadian Society of Forest Engineers. He has been for a long time one of the moving spirits in *Los Amigos del Arbol*, the Spanish Forestry Association and is the editor of *Espana Forestal*, a very interesting and well gotten-up forestry journal. The illustrations in this paper are exceptionally good and the articles well worth reading. The order of Isabella the Catholic was bestowed on Senor Codorniu a few years ago by popular petition. Senor Codorniu is an enthusiastic Esperantist.

The British Columbia Forest Service will again use a hydroplane for forest patrol. The first attempt failed owing to an accident in which the pilot landed on the roof of a house and went through into the bedroom of one of the occupants.

Sometime during the coming summer the Dominion Forestry Branch will test out an aeroplane in the Province of Alberta. The machine will be specially altered to meet the requirements of fire protection work.

Prof. R. B. Miller, who has been in charge of the Forestry Department at the University of New Brunswick, is at Yale where he has been acting as lecturer in the Forest School on Forest Management. He is also taking special post-graduate work.

The Co-operative Fire Protective Associations in Quebec have purchased moving

picture machines and will carry on a campaign in the rural districts and those remote from the railways to educate the people in the need for fire protection and forest conservation. The educational program carried on by these associations has in the past done more than anything else to reduce the number of fires and the people are learning that they are partners and co-owners with the limit holders and have a large stake in the forests. In many parts of Quebec the farmers could not live if they were not able to work in the forests in winter.

Major A. R. Lawrence has come forward with a proposal to put forest ranging and game protection under a semi-military organization in Ontario, something along the lines of the famous Northwest Mounted Police. This might possibly be a success if it were as well handled as that celebrated organization, but something would have to be done to find work for the men in the winter and the cost might make the taxpayers think twice before adopting it.

The exports from Canada's forests, as shown by the bulletin of the Department of Trade and Commerce for the year ending November, 1918, were \$64,281,861, or an increase of 22 per cent over the previous year. This was double the amount of fishery exports and 85 per cent of that of minerals. In addition to these primary forest products wood-pulp amounting to \$32,580,619 was exported. The pulp and paper industry is the most important by far for the Province of Quebec.

The Abitibi Pulp and Paper Company has become one of the co-operators with the Commission of Conservation in the study of cut-over pulp wood lands. This research bids fair to be of the utmost importance for the determination of proper

silvicultural methods in the handling of these lands and is throwing much light on the subjects of reproduction and growth.

The necessity for an inventory of the forest resources of Canada is becoming more and more pressing. The results of the Commission of Conservation's work in British Columbia will be published shortly. Nova Scotia has been covered, an intensive survey of New Brunswick is under way, but Ontario and Quebec, next to British Columbia the most important forest provinces, still have very little knowledge of the extent or amount of their resources. A little work has been done by private owners, some of whom have made intensive surveys of sections 2,500 to 3,000 square miles in area. The only bases for estimating over large sections are the results of such surveys and some of a few hundred square miles made by the Provincial Forestry Services. The aeroplane offers such a rapid and easy method of reconnaissance for these huge areas, inaccessible in any other way, that work of this character must be undertaken very soon. The permanence of the lumber and paper industries is of vital importance for eastern Canada and the industries themselves are doing more than their share of the work to insure it.

The Laurentide Company, Ltd., which made a successful experiment in grinding hardwood for pulp last year is preparing to conduct experiments in barking both with knife and drum barkers. It has been said that hard wood barks in drum barkers easier than spruce. Experiments are also under way in regard to driving this wood by water. Should the experiments prove successful a means will have been found to lessen materially the drain on our waning soft wood supplies.

NEW BRUNSWICK FOREST SERVICE STAFF CONFERENCE

BY ELLWOOD WILSON

MANY of the Forest Rangers, Scalers, Game Wardens, and Fire Wardens of the outside staff of the Crown Land Department met in Fredericton on Wednesday and Thursday April 2 and 3. The Conference has been called by the Forestry Advisory Commission with a view to considering improvements in the methods of scaling, fire protection and game protection in the interests of efficiency.

The main part of the program called for a practical discussion by the Rangers themselves of many of the questions under consideration, although a number of outside speakers also addressed the Rangers.

GEORGIA TRAINING FORESTERS FOR THE WAR DEPARTMENT

DURING the war the forester, as much as the chemist and engineer has demonstrated his worth. In connec-

tion with the first Engineering Corps there was recruited a "Forestry Contingent," and, even before this, various New England states had sent over a number of forestry units to assist England in logging and manufacturing her forests. During the past year the War Department has been busy recruiting a Forestry Corps for duty in France. The fact is that this war was largely an engineering problem; hence the unparalleled demand for that greatest of all construction materials—wood. Transportation lines must have wood for ships, for cross-ties, for bridges, and for cars. Of what value would food and soldiers have been if we had not the means of transporting them to where they are needed?

The crowning achievement of the great war is the wonderful way in which the United States organized her resources towards the successful culmination of that project. With the approval of her people the Government took over the direction of railways, ships, munition factories, mines and whatever was needed in pushing the war. The State universities and colleges became great training camps in preparing men for technical projects under the War Department. In the Students' Army Training Corps men with the proper preparation were given an opportunity to secure military instruction while fitting themselves along some specialized line of endeavor. Courses of study were modified so as to eliminate all but the essentially practical; the emergency demanded intensive but thorough training. Instead of requiring four years to graduate an engineer, forester or chemist, the same result must be achieved in a half or a quarter of the time. No thought could be given to college credits; the object was to give the Government the efficient men it demanded and in the shortest time possible. It was with this thought in view that the two-year course in Forest Engineering was organized at the University of Georgia. The subject matter of the course was arranged with the approval of the Committee on Education and Special Training, War Department.

The specialized course in Forest Engineering covers a period of two years, although each year is largely independent of the other and each term of the other. This means that a man may enter at the beginning of any term and successfully pursue the work. The year is divided into four terms of twelve weeks each. The fourth term of each year is conducted in the woods on a logging or milling operation, where the men have an opportunity to become proficient in the handling of machines, instruments and tools.

The course covers a period of two years, the year consisting of four terms of twelve weeks each. Three terms of each year will be spent at the University; the fourth on some woods or milling operation. The understanding is that these students will be

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permitted to complete the period of training. For this reason the subject of forestry has been placed in the same category as the subjects of medicine, engineering and agriculture.

For further information address the Chancellor, University of Georgia, Athens, Georgia.

ARMY AIRCRAFT TO FIGHT FOREST FIRES

ARMY airplanes and captive balloons will cover portions of the National Forests of California, Arizona, New Mexico, and other States this summer, to aid in detecting and suppressing forest fires. In compliance with an order from Secretary Baker directing the Air Service to co-operate with the Forest Service of the United States Department of Agriculture in this work, conferences are under way to determine where, and to what extent the air scouts will supplement the forest rangers.

That there is a distinct and important place for aircraft in fire protection of timberlands is regarded by the forestry officials as beyond doubt, but experimental trial of methods and possibilities will have to be the first step. This is now being planned for the coming fire season. Army air-dromes and bases will be utilized for the experiments. Some of the bases near enough to National Forests to be used advantageously are the flying fields at San Diego, Riverside, and Arcadia in southern California. Other points in the West and in the East are under consideration, including one near the White Mountains in New Hampshire.

One of the interesting possibilities to be tested is bombing fires to put them out.

It is believed that bombs charged with suitable chemicals can be used with good results. Another plan to be tested is transporting fire-fighters by dirigibles from which ladders can be lowered to the ground.

The chief use of the aircraft this summer, however, will be for fire detection. At present the Forest Service relies for this partly on patrol, usually by men on horses, motorcycles, or railroad speeders, and partly on watchers stationed at lookout points. Aircraft have many points of obvious superiority for both classes of detection work.

Lookouts in a very broken country, cut up by deep canyons or where mountain ridges obstruct the view, or in a flat country that affords no good points of vantage, are often unable to pick up all fires quickly by the rising smoke, or to locate them accurately. For precise location the system in use depends on triangulation through reports telephoned from separate observation points. Airplanes would use wireless in reporting fires, as they have done in communicating with the artillery, and would locate fires by co-ordinates in the same way that gun fire in war is directed to a particular spot or object.

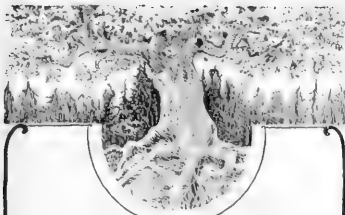
From the Army standpoint, the use of aircraft in protecting the National Forests affords a valuable opportunity for training flyers and developing further the possibilities of aircraft and the art of flying.

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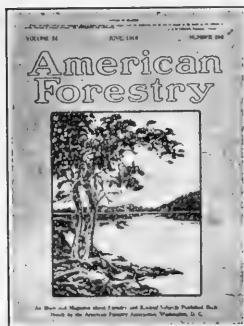
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AS PATRIOTS AND WOODSMEN YOU ANSWERED THE FIRST CALL OF COUNTRY AND OF CIVILIZATION AND OFFERED WITHOUT STINT OR DELAY YOUR LIFE'S EXPERIENCE IN THE FOREST, THE MILL, THE TRADE OR THE PROFESSION, IN GENEROUS AND HIGH ENDEAVOR TO BRING EMERGENCY AID TO STRUGGLING FRANCE, IN ORDER THAT THE MEN AND GUNS MIGHT FOLLOW AFTER. THE CALL WAS MOST PRESSING AND THE ORGANIZATION WHICH YOU PERFECTED IN AN INCREDIBLY SHORT TIME WAS SUFFICIENT AND UNIQUE.

YOUR ACHIEVEMENT OF THE TASK ASSIGNED YOU WAS NOTABLY SUCCESSFUL, HONORABLE TO THE INDUSTRY YOU REPRESENTED AND TO YOURSELVES, AND WE OF THE FOREST AND LUMBER FRATERNITY WELCOME YOU HOME AGAIN WITH A PECULIAR PRIDE IN YOUR PERFORMANCE AND A DEEP APPRECIATION OF THE DEBT WE OWE TO YOUR UNSELFISH DEVOTION AND ENDEAVOR.

W. R. BROWN,

ACTING CHAIRMAN OF WELFARE FUND FOR LUMBERMEN
AND FORESTERS IN WAR SERVICE.



Roof planks of weaver shed of textile-mill destroyed by decay in nine years.
(Courtesy F.J. Hoxie, eng., Associated Factory Mutual Fire Insurance Cos., Boston.)

Partly Decayed Wood is a Serious Fire Hazard

The Inspection Department of the Associated Factory Mutual Fire Insurance Companies, in their pamphlet "Dry Rot In Factory Timbers" states—*"The loss to mills from rotting timber is many thousands of dollars a year. Wood infected by dry rot ignites more easily than sound wood, and mill timbers with rotted ends fall more quickly under fire."*

Rotted timbers are also apt to fail mechanically, jeopardizing the life and limbs of workmen.

The use of Carbosota Creosote Oil will retard decay, practically eliminate rot and lessen the fire hazard. *Creosoted wood when dry is no more combustible than sound untreated wood, and is decidedly less inflammable than partly decayed wood.*

"Of whatever kind of wood the outer part of the roof is (referring to a double roof), it should be completely penetrated with hot creosote so as to sterilize it and prevent the development of fungus. Such an outer insulating covering will be found as practicable for a concrete roof as for a wooden roof." F. J. Hoxie, American Architect, 1-29-19). Non-pressure treatments are most suitable to the conditions encountered in new construction, or re-

pairs to roofs. Every mill should be equipped with a simple open tank creosoting plant, and all timber and boards which will be placed in a situation favorable to development of decay, should be creosoted.

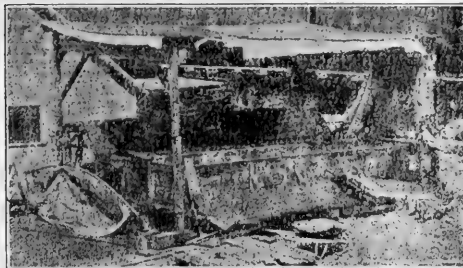
Carbosota Creosote Oil is a pure, high-grade coal-tar creosote oil, especially refined for use in non-pressure processes. It conforms to the recognized standards, as represented by Specification No. 128 issued by the United States Shipping Board Emergency Fleet Corporation.

The services of our experts may be obtained gratis, when required.

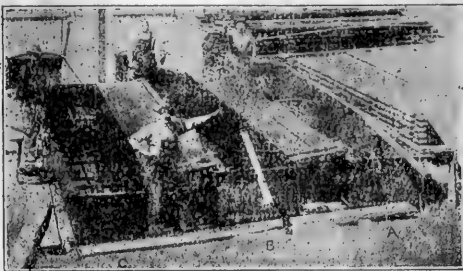
(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)

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Plant for creosoting roof boards and timbers with Carbosota by Open Tank Process. Two wooden tanks lined with galvanized sheet iron, soldered at joints, one for "hot treatment," the other for "cold treatment."



Permanent portable plant built by large paper mill for creosoting roof boards and misc. flammable lumber. (a) Tank for hot treatment. (b) Tank for cold treatment (c) Tank for catching drippings.



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DAVEY TREE SURGEONS

Every real Davey Tree Surgeon is in the employ of The Davey Tree Expert Co., Inc., and the public is cautioned against those falsely representing themselves



TIMBER AND PROSPERITY

THE best welcome to the men of the Twentieth Engineers (Forestry)—and the other units of the A. E. F.—is the assurance of national prosperity, in which they will share. In the first flush of home-coming, they are just "our boys," whether from your home or office or from ours. But we soon find that the Khaki and the tan are merely transient symbols of a broadened vision and clarified ideals, which will be permanent and potent influences in the new political, civic and industrial era now at hand.

They have made good, with an enthusiasm and optimism which is needed in the readjustment period—and beyond. With their aid, America will make good, in keeping with the best traditions. It was a good country to live in before the war; IT CAN BE MADE BETTER IN THE FUTURE. Our energies and resources must now be devoted to the establishment of permanent prosperity.

Our part in this program concerns the indispensable basic raw material—standing timber. From forty years' successful experience, we can speak emphatically of its place as a prosperity-producer and of its importance in all industrial fields. Timber is our specialty and we are able, as Timber Land Factors, to help others realize the most from the purchase, ownership and use of timber.

Wood in some form is used in every industry and in every home. The war emphasized its vital importance; peace will bring renewed demands. Timber is available for the immediate needs of the prosperity era, but to assure an adequate supply for the more distant future requires closer utilization and more conservative measures in cutting. These will come as values rise, and will give new avenues of profit.

We have foretold and proved for many years the soundness of WISE timber investments. Opportunities still exist, but with the few remaining gilt edge tracts out of the market, the day of low priced stumpage will be past. This means "buy now." Already the spirit of co-operation has welded the units of the lumber industry into more stable form, and the gospel of service to consumers and the public has a dominant place. NO CREATIVE INDUSTRY HAS A GREATER BUSINESS FUTURE.

In no field can the men of the Forestry Regiment find a better outlet for their energies and experience than in forest work at home. We welcome them and will work with them in the development of our forest resources. In this, as in other lines, co-operation will bring prosperity for all.

Chicago
New York
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JAMES D. LACEY & CO.

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PERCIVAL SHELDON RIDSDALE, Editor

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VIEW OF BOURICOS 20-M AMERICAN SAWMILL NEAR PONTENX, LANDES, SHOWING LOGS ON SKIDS READY TO BE TAKEN INTO THE SAWMILL

An Appreciation

Hq. 20th Engineers (For.)
U. S. M. P. O. 717
December, 1918

To the Officers and Soldiers of the Twentieth Engineers and Attached Service Troops:

ON November 25, 1917, the first board was cut in France by American Forestry Troops at a little French mill in the Jura Mountains. At the same time, another detachment was getting out 50-foot piling in the Landes on escort wagons drawn by hand. The total cut during December, 1917, was 321,000 board feet of lumber and 12,000 railroad ties.

When the armistice was signed on November 11, 1918, the 20th Engineers were operating 81 American Sawmills and producing 2,000,000 feet of lumber and round products every working day. Up to December 1, we have cut a total of 272,500,000 feet of lumber, including 2,728,000 railroad ties, together with 38,000 pieces of piling, 2,739,000 poles of all sizes and 892,000 steres of fuelwood.

Recent reports from the various depots and construction projects of the A. E. F. show that the Army was at the time of concluding the armistice well supplied with lumber. When ties were called for in large quantities to support the advances of our troops at St. Mihiel and the Argonne, they were ready. At practically every dock project, deliveries of piling and lumber were well ahead of the construction. In other words, the Forestry Troops have made good on the work for which they were brought to France. Notwithstanding the difficulties in obtaining equipment and transportation, notwithstanding the enormous increase in the size of the A. E. F., and the work which it undertook over the original estimates, the Army has been given the lumber which it needed, and the suspension of hostilities finds us with a substantial surplus which will be used for the restoration of France. This is an achievement in

which every man in the Forestry Troops may well take pride, for every one of you have had a share in it. Your part in winning the war has been as important as that of any other troops in the A. E. F. Your loyalty and enthusiasm have been put to a hard test. You wanted to get to the front, but could not. You have had to put in long hours of the hardest kind of work, month after month, without glory or excitement, and without the

special forms of recognition given to combat troops. The Medical Officers have told us that the Forestry Troops were being worked too hard, but the only answer has been a steadily increasing cut of lumber from month to month. You have failed in no task that has been assigned to you. You have gotten more out of sawmills than had ever been dreamed of by mill operators at home. Time and again, in spite of difficulties such as lumbermen never contended with before, you have exceeded our expectations. Your record as members of the A. E. F. will be a source of pride and satisfaction to you as you return to civil life. It will be your recompense for the sacrifices which many of you have made to come to France.

As Commanding officer of the 20th Engineers, I thank you for the untiring and uncomplaining way in

which you have done your work. I am glad to have been identified with such a body of American soldiers.

A copy of this order will be sent to every company and detachment of the 20th Engineers, and attached service troops; read to the troops, and posted on the Company or Detachment bulletin board.

J. A. WOODRUFF,
Colonel, Engineers.



COL. JAMES A. WOODRUFF
Commanding 20th Engineers (Forestry)

AMERICAN FORESTRY

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JUNE, 1919

NO. 306

THE AMERICAN LUMBERJACK IN FRANCE

BY LIEUT.-COL. W. B. GREELEY, 20TH ENGINEERS

NOTHING illustrates the far-reaching economic demands of the Great War more sharply than the enormous use of timber in almost every phase of military operations. From the plank roads at the front, the bomb proofs, the wire entanglements, and the ties needed for the rapid repair or construction of railroads upon which military strategy largely depended, to the hospitals, warehouses, camps, and docks at the base ports, timber was in constant demand as a munition of war. One of the earliest requests for help from the United States by both our French and British allies was for regiments of trained lumbermen. General Pershing had been in France less than two months when he cabled the War Department for a force of lumberjack soldiers large enough to cut upwards of 25,000,000 board feet per month for the American Expeditionary Force. A year later, the requirements of the enormous army then planned for and being sent to France with all possible speed were put at over 73,000,000 board feet per month.

Such was the task marked out for the lumberjack regiments of the American Army, for the lack of ocean transport made it necessary to obtain practically all of this material from French forests. The organization of these lumberjack units, all of which were combined later in the 20th Engineers (Forestry), began in May, 1917, and continued until March, 1918. By May, 1918, forty-eight

companies of forest and road engineers, each 250 men strong, had been sent to France. The core of a 49th Company was obtained subsequently from the New England sawmill units which were sent to old England in

the early summer of 1917 to cut lumber for the British Government. These troops represented every State in the Union. Practically every forestry agency in the country, together with many lumber companies and associations, took off their coats to help in obtaining the right type of men. The road engineers of the United States took hold of the organization of the twelve companies of troops designed for road construction in a similar spirit. The lumber units were officered largely by picked men of experience in forest industries of America; and the road units by road and construction engineers of exceptional technical ability.

The earlier units were made up entirely from volunteer enlistments. The later units contained a large proportion of men from the draft, selected for forestry work mainly on the basis of their former occupations, together with many volunteers beyond the draft age from among the experienced loggers and sawmill mechanics of the country. But there was no distinction between volunteer

or drafted soldiers in the way the American lumberjacks hit their job in France. These men represented the best of their hardy and resourceful profession in the United



LIEUT.-COL. W. B. GREELEY

States. They came straight from her forests and saw-mills, trained in her woodcraft, with all of the physical vigor, the adaptability to life in the open, and the rough and ready mechanical skill of the American woodsman. They knew their work and were ready to put all that they had into it.

Furthermore, these lumberjack soldiers felt in a peculiar way that their country was behind them. This was not only in the focusing of national forces from every

crews made off with the laurels of certain pure lumberjack units, in the records of the operations for production.

To meet the growing requirements of the American Army, Engineer Service battalions were rapidly added to the forestry and road troops during the summer and fall of 1918. At the end of hostilities, thirty-six Service companies were working with the 20th Engineers. The first four of them were white troops, organized as the

"The lumbermen and foresters of the United States may well take pride in the men who have represented them on the American Expeditionary Force. Now they are returning, better men for the sacrifices they have made, for the sense of organization and responsibility which they have learned, for the difficulties which they have mastered, and for the understanding which they have gained of forest culture and forest thrift in France. Such a body of trained men represent an asset of the utmost value to the forest industries of America. Let us recognize their worth and their capacity by an intelligent direction of the return of these soldiers to civil life in positions where their experience in national service can be effectively utilized."—Lt. Col. W. B. Greeley, 20th Engineers (Forestry).

point upon winning the war, but in the special efforts of the forest industries to man and equip the lumber regiments. Many lumber companies had sacrificed their own interests in urging valued employees to join the ranks of the forest regiments. In many cases differences in pay were made good by old employers or provision made for the families left behind. And the lumberjack soldiers felt, too, the backing of friendliness and forethought which followed them to France, in the organized steps taken by the lumber and forestry associations for their comfort and welfare.

Special credit is due to the officers and men of the three battalions, the 41st, 42nd, and 43rd Engineers, which were organized and equipped for road and construction work in connection with forestry operations. They came to France keen to take up this task, for which they too had been especially fitted by training and experience.

But the necessities of war dictated otherwise. They landed in France to find the undermanned Forestry Section struggling to keep up with the timber needs of an army already twice the size of that originally intended. It was necessary for these road builders to turn lumberjacks themselves, cutting fuelwood, piling, or entanglement stakes as occasion demanded and manning the new sawmills which were installed as fast as they arrived from the United States. The road companies took hold of this work, to which most of them were unaccustomed, with splendid spirit, and in the end some of their mill

503d Engineers. They contained a large proportion of railroad men and other skilled workers, and were soon in the mills and woods and on railroad jobs, on all fours with the forestry troops. Upon the other Service Companies, composed of colored troops, fell the brunt of cutting the fuelwood which the Quartermaster was calling for by the hundreds of thousands of cords. But several sawmill crews composed largely or entirely of black soldiers made exceedingly creditable records.

The first board was cut by the American troops in France, at a little French mill in the Jura Mountains, on November 26, 1917. The first American mill began sawing near Gien, on the Loire River, November 29, 1917. Still earlier, another company of the old 10th Engineers began cutting fifty-foot piling in the pine forests of the Landes, hauling them out of the woods on the running gear of army supply wagons, by man power. On the

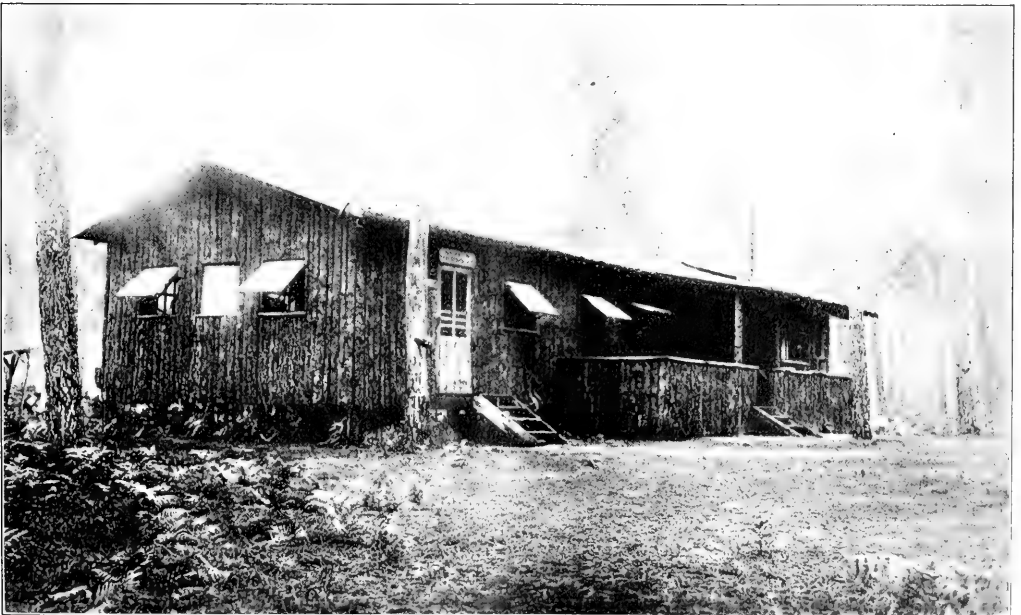
Lt. Col. W. B. Greeley is Assistant Forester of the United States. He has had general charge of all forestry operations of the regiment and his administrative ability, his knowledge of forestry and lumbering had much to do with the successful work of the regiment. The French have honored him by presenting him with the Legion of Honor. Shortly before this honor was conferred upon him he induced the French government to reduce its bill against the A. E. F. for forest acquisition about 2,000,000 francs.

Editor, American Forestry Magazine.

date when the armistice was signed, the 20th Engineers were operating eighty-one American sawmills in France and cutting 2,000,000 feet of lumber, ties, poles and piling every working day. One year after the first American saw bit into its first log in France and shrilled defiance at the Kaiser, the forestry troops of the American Expeditionary Forces had cut 300,000,000 board feet of lumber and ties, 38,000 piles, 2,878,000 poles of all sizes, and 317,000 cords of fuelwood. It is impossible, in a few words, to tell of the labor, the Yankee ingenuity, and the resolution to back up our fighting doughboys which were



A LOG CABIN BUILT NEAR PONTENX, LANDES, FRANCE, BY A SQUAD OF AMERICAN RIVER DRIVERS IN THE 20th REGIMENT.
THE FRENCH NEVER USE WOOD SO LAVISHLY IN BUILDING



OFFICE BUILDING AT CAMP OF THE 20th ENGINEERS IN FRANCE



MILL OF 20th ENGINEERS IN MOUNTAINS OF EASTERN FRANCE. LARGE TIMBERS BEING LOADED ON TRAILERS READY FOR HAULING TO THE RAILWAY

called for to win these results. Nor is it possible to describe the pressure upon all of us during the summer and fall of 1918 when every lumberjack in the regiment felt the tenseness of the final grapple and put everything he had into it. I will never forget the big mill at Eclaron as I saw it one October night — sparks streaming from its stacks, its two carriages flashing back and forth, loads of oak logs creaking up to the mill deck, cars being shunted about, ties loaded into them hot from the saws, and the sober, earnest faces of the men as they worked under the electric lights. They were shipping 5,000 ties daily to the Argonne offensive. That scene was typical of the eighty or more forestry operations in France during the great drive. It is doubtful if American resourcefulness was ever put to a harder test than during the first months of the forestry work

in France. One company of the 4th Battalion began skidding ties with harness made out of ropes and old sacks, and bridles fashioned from twenty-penny nails and

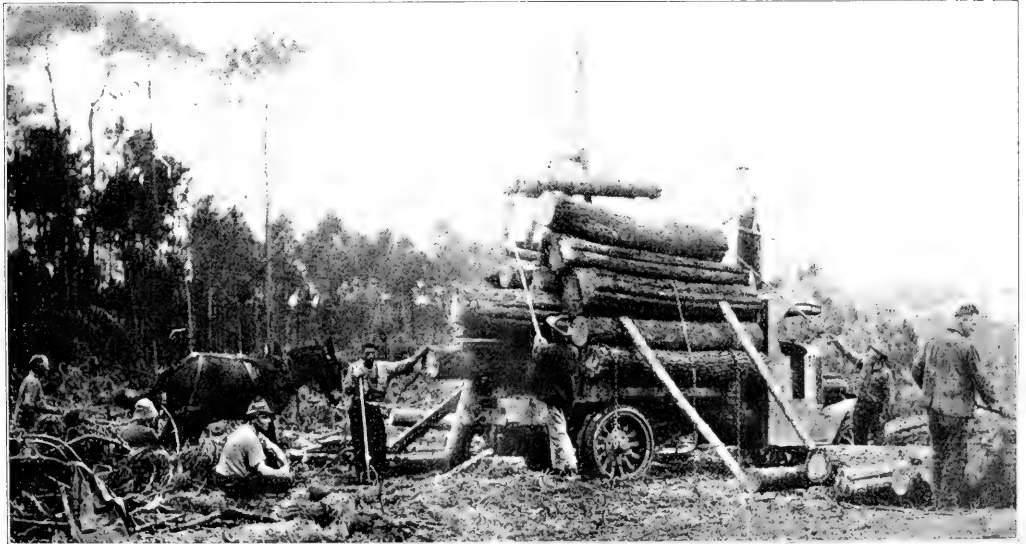
wire. This "hay-wire" camp speedily made off with the monthly records of the section for tie production. During the long, anxious wait for the arrival of the American sawmills, French mills of various antique designs were utilized at many points. On his introduction to one of these, a millwright from the northwest offered to eat its daily cut. The French mills were aggravations of the flesh and promoters of profanity. They all had to be bolstered up, more or less rebuilt, have carriages devised out of any odd lots of machinery at hand, and new saws added. Poor as they were, they served to tide the army over its first few months in France, and their production under the "ancient regime" was



AN AMERICAN FORESTRY ENGINEER AT THE WATER BAG WHICH CONTAINS THE CAMP'S SUPPLY OF DRINKING WATER. THE ROOF OVERHEAD KEEPS THE SUN OFF THE BAG, AND A DITCH CARRIES AWAY THE LEAKAGE



BARBED WIRE STAKES, TO BE USED LATER AT THE FRONT, CUT AND STACKED ALONG BROAD GAUGE RAILWAY IN A HARDWOOD FOREST IN CENTRAL FRANCE



LOADING MARITIME PINE PILING IN SOUTHWESTERN FRANCE, NEAR PONTENX, LANDES



ANOTHER TYPE OF THE 20-M AMERICAN SAWMILLS USED BY THE AMERICAN FORESTRY AND LUMBERING TROOPS IN FRANCE

doubled or trebled by the lumberjack soldiers.

As the American mills were installed and production jumped month by month, fierce joy of rivalry seized the souls of the forest engineers. Time would fail to tell of the early contest between A and B Companies of the 10th Engineers, when records stood but a day or two and our "ten-thousand" mills showed up as twenty-five and thirty thousand a day producers. The largest day's cut at any forestry operation was turned out by the 27th Company at Mouthe, which in 23 hours and 35 minutes cut 177,486 board feet of fir lumber and timbers on a "twenty-thousand" mill. The largest twenty-hour cut, 163,376 feet, was made by the 37th Company (Old F Company of the 10th Engineers) at Levier with the same type of mill and product. The 26th Company at La Cluse holds the record for a twenty-hour run with a "ten-thousand" mill, 78,881 feet; close behind came the 24th Com-

pany with a record cut of 68,650 feet, the 30th with a cut of 63,849 feet, and the 49th Company at Murat, organized to build roads, with 63,000 feet. The 23d Company, at Marchenoir, holds the record for a twenty-hour cut with a "ten" mill in hardwoods, knocking off 55,539 feet. The 22d Company, at La Gavre, pushed its

rival hard, however, with a twenty-hour cut of 49,416 feet of oak lumber and timbers. One of the best hardwood records is that of the 2nd Company, at Grande Mirebeau, which was determined to reach the million a month mark with a "ten" mill, and finally did so, in October, with a cut of 1,000,620 feet. One of the most remarkable achievements was that of the 19th Company, which in ten and one-half hours cut 64,047 feet of straight oak ties with a bolter mill rated at five thousand feet per day.

Small wonder that the American Lumberman has indicted the forest engineers of the American Expedi-



20th ENGINEERS FELLING LARGE BEECH TREE IN CENTRAL FRANCE



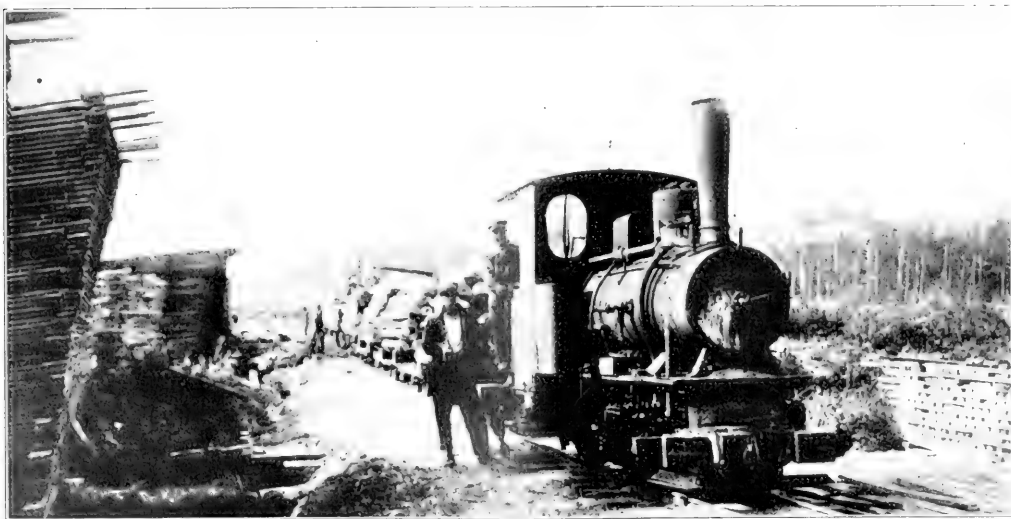
LOG DECKS ALONG A FLUME LEADING TO A MILL OF ONE OF THE COMPANIES OF THE 20th REGIMENT IN SOUTHWESTERN FRANCE



AMERICAN CAMP WITH TENTS "MUSHROOMED" IN THE SHADE OF A MARITIME PINE FOREST NEAR THE ATLANTIC COAST IN SOUTHWESTERN FRANCE



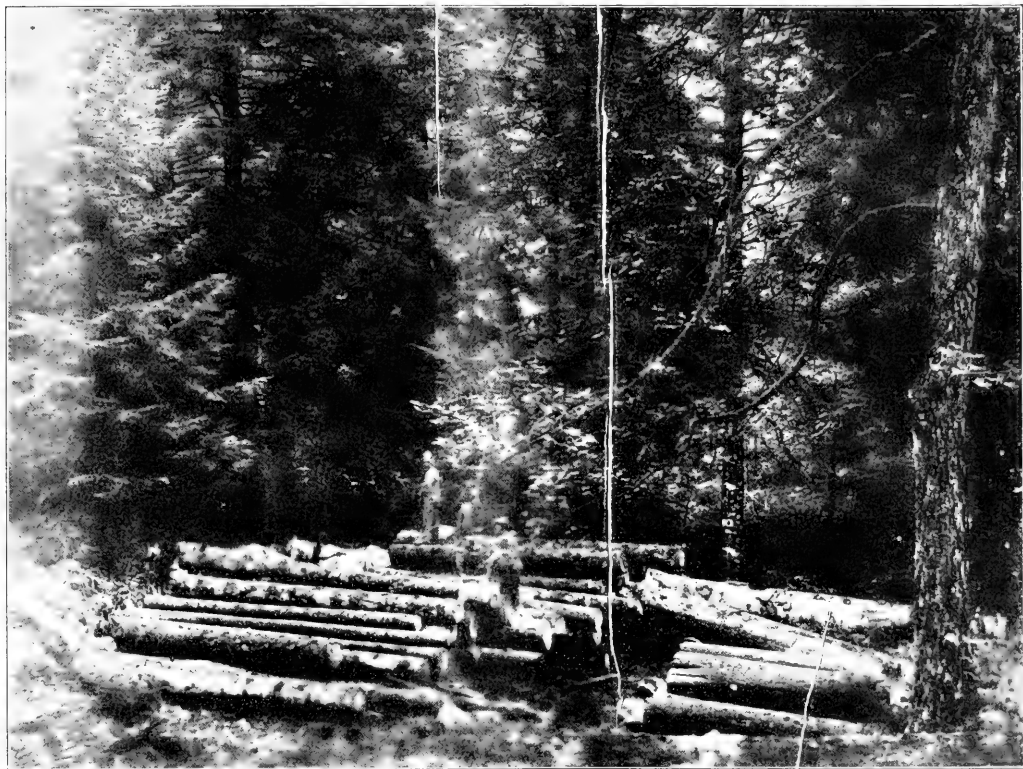
VIEW OF AUREILHAN LAKE, FRANCE, FROM AMERICAN 20-M SAWMILL. LOGS WERE TOWED ACROSS THE LAKE FROM THE MOUTH OF THE COURANT RIVER, BROUGHT TO THE BOOMS AT THE EDGE OF THE LAKE, THEN POLED ALONG THE CANAL TO THE POINT IN THE FOREGROUND WHERE THEY WERE LOADED UPON A SMALL CAR WHICH WAS PULLED BY CABLE UP THE INCLINE INTO THE SAWMILL. THE LARGE HEAP OF SAWDUST AT THE RIGHT WAS PRODUCED BY THE MILL AS THE RESULT OF SEVERAL MONTHS' OPERATION



A TRAIN LOAD OF TIES BEING TRANSPORTED BY NARROW GAUGE RAILWAY TO THE MAIN LINE IN THE MARITIME PINE FORESTS OF SOUTHWESTERN FRANCE

tionary Forces for "cruelty to machinery." But the Hun wanted war—and, by the shades of the forest primeval, he should have it. It is difficult to stop in recording these instances of how the American lumberjack "tied into" their work in France. The 6th Battalion, working for the British Army at Castets, cut 124,242 feet in nineteen hours with a twenty-thousand Canadian sawmill, and 72,697 feet in twenty hours with a French band mill whose makers would have been aghast at such perform-

gineers contain records of twenty thousand foot mills set up and running fourteen days after the first machinery arrived; of a ten-thousand mill dismantled, moved fifty miles, re-set, and sawing on the eighth day; and of another "ten" mill moved about half that distance and sawing its first log forty-seven hours after the last log left its carriage at the old set. These were not holiday contests, staged after weeks of preparation. They are cited to illustrate the spirit of the 20th Engineers;



A LOG LANDING OF A 20th REGIMENT DETACHMENT IN ONE OF THE FORESTS OF FRANCE

ances. The 13th Company, at Brinon, cut 1,361 pine logs on a "ten" mill in twenty hours, with a yield 53,895 feet of lumber. Many of the American "twenty" mills cut steadily upwards of 1,200,000 board feet per month, and several of them exceeded 2,000,000 feet monthly on their best runs. The spirit of "hitting her hard" pervaded every camp. The 19th Service Company, at Collonges, not to be outdone by the chesty mill crews, organized a fuelwood contest in which 100 black soldiers averaged 6.31 cubic meters of cut wood daily for a week. It is even rumored that a red-headed captain of the old Tenth, learning from his own spies that his monthly record was in jeopardy, connived with his men to put on a Sunday night shift, something strictly tabooed by the Forestry Regulations. The annals of the 20th En-

but the great service of the regiment lay in its sustained effort, month after month, on exacting physical labor, much of it under the incessant rains and in the indescribable mud of France.

In the spring of 1918 came orders to furnish 15,000 piling in lengths up to 100 feet, with all possible haste. These timbers could not be brought from the United States and were essential to complete the docking facilities required by the rapid increase in the American Expeditionary Force. Again the resourcefulness of the forest engineers was put to the test, for every nook of France had to be scoured for long timbers and practically every tree that was large enough had to be cut—no matter where it stood. The 2d Battalion—up in the Vosges Mountains—covered itself with glory, get-



AN AMERICAN 20-M SAWMILL IN THE SAND DUNE COUNTRY OF SOUTHWESTERN FRANCE, NEAR THE COAST. MARITIME PINE FOREST IN THE BACKGROUND.



AMERICAN FORESTRY ENGINEERS IN FRONT OF TENTS IN THEIR CAMP AT ST. DIZIER, HAUTE MARNE



HAULING PILING 60 TO 80 FEET LONG BY MEANS OF MACK TRUCK AND TRAILER FROM THE FOREST TO THE SHIPPING POINT
IN EASTERN FRANCE



CAR LOAD OF MARITIME PINE LOGS BEING DUMPED INTO AUREILHAN LAKE TO BE TOWED TO THE AUREILHAN AMERICAN
SAWMILL NEAR PONTENX, LANDES. NARROW GAUGE RAILWAY SHOWN. THE MULES BRING THE LOGS FROM THE PINE
FORESTS OF THE SAND DUNES.



LOADING MARITIME PINE LOGS ON NARROW GAUGE RAILWAY CARS FOR TRANSPORTATION TO AMERICAN 20-M MILLS IN SOUTHWESTERN FRANCE. THE PINE FOREST IS HERE CUT CLEAN. BIG WHEELS USED TO SKID LOGS TO THE RAILWAY SHOWN AT THE RIGHT

ting out 9,399 "long and straight" ones faster than the docks could use them. Nor was it a simple trick to get 90 and 100-foot sticks out of the little gullies and down the long, winding roads of the Vosges. The 5th Battalion, meanwhile, was running an express train service with tractors and steel-tired trailers—taking out 80-foot spruce piles over ten miles of French highways. This Battalion furnished over 5,000 piles for the American docks.

New demands upon the forestry troops followed the formation of the American First Army. A flying squadron of lumberjacks was organized by the 2nd Battalion, to work in small units with portable mills at the advance Engineer dumps and cut from day to day bridge timbers, nine sets, bomb proofing the material most urgently required and which could not be forwarded quickly enough from the rear. All told, the 20th Engineers operated thirteen of these advance camps. Their lumberjack soldiers had a real of work close to the with frequent occa-

sion to take shelter from bombardments and night bombing raids. And it was while scouting for a new camp in the Argonne that Capt.

Harry H. McPherson and Lieut. Wilford A. Fair, of the 20th Engineers, were shot down by German machine-gunners.

Last December Colonel James A. Woodruff, commanding the 20th Engineers, summed up the work of the twelve thousand odd lumberjacks comprising the regiment in a general order which was a cordial commendation. (See page 1092.)

Not all of us were permitted to share in this achievement. With sorrow but with pride the 20th Engineers recall the ninety-one men of the 6th Battalion who won their golden stars on the transport Tuscania. The story is best recorded in the words of an officer of that battalion:

"On the morning of the eighth day out from Halifax, the convoy was met by seven British destroyers, which romped along like porpoises in the heavy seas. With this protection everybody on board felt pretty safe, especially



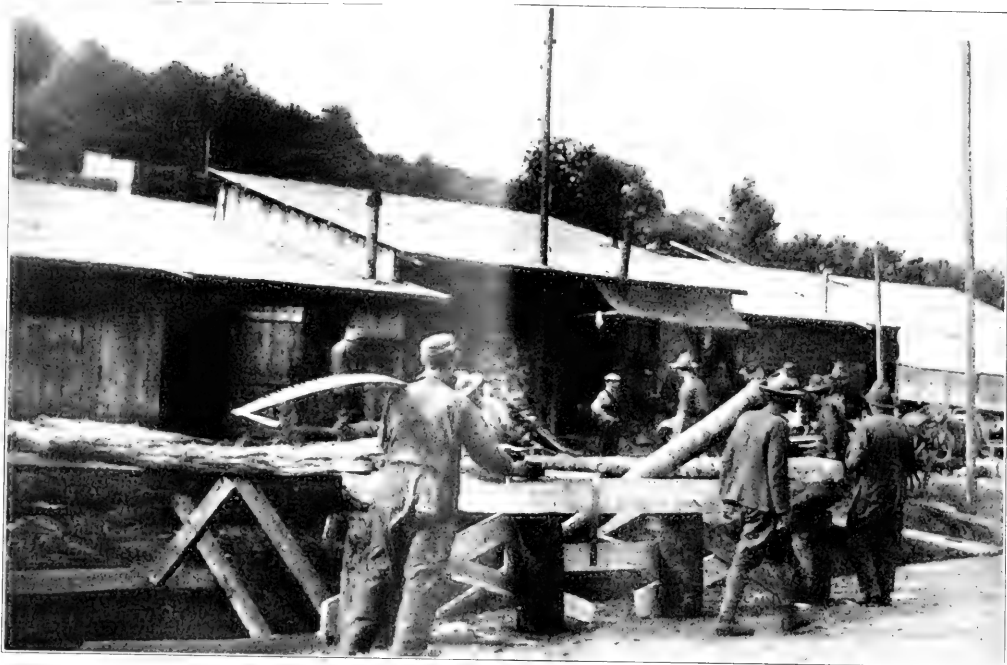
AN OFFICER OF THE 20th ENGINEERS AT A BATTALION HEADQUARTERS IN FRANCE



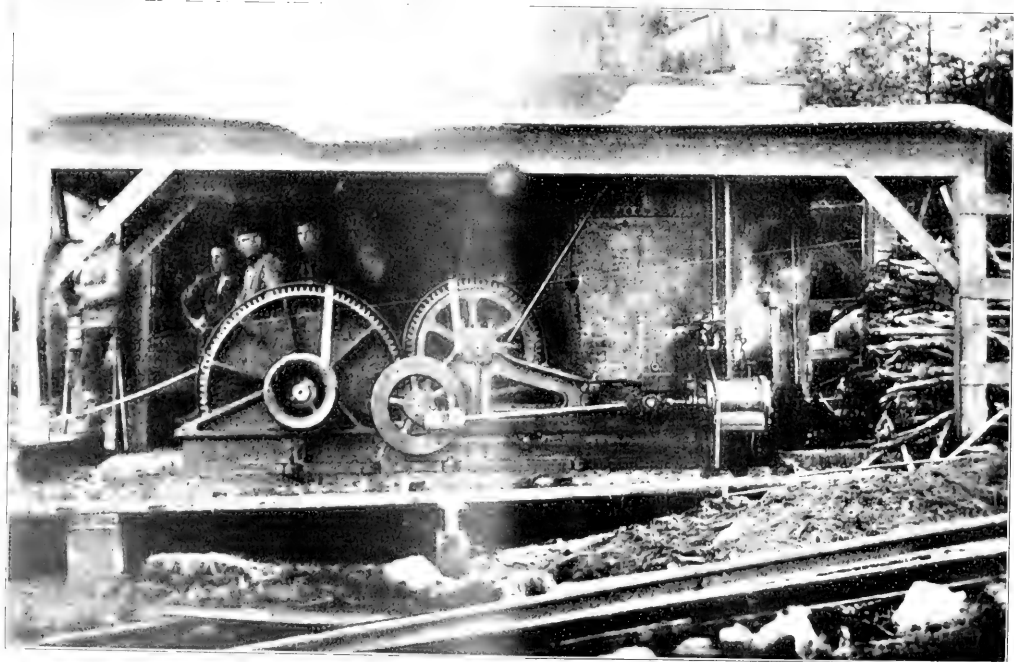
LOG TRAIN AT THE RIGHT COMING FROM THE MARITIME PINE FOREST TO THE LABROQUETTE 20-M. AMERICAN MILL NEAR PONTENX, LANDES. THE LOGS ARE UNLOADED ON TO SKIDS AND ARE THEN ROLLED INTO THE FLUME IN THE FOREGROUND, ALONG WHICH THEY ARE FLOATED TO THE MILL. THE LOGS ARE LIFTED FROM THE FLUME INTO THE MILL BY CHAINS. MARITIME PINE FOREST IN THE BACKGROUND



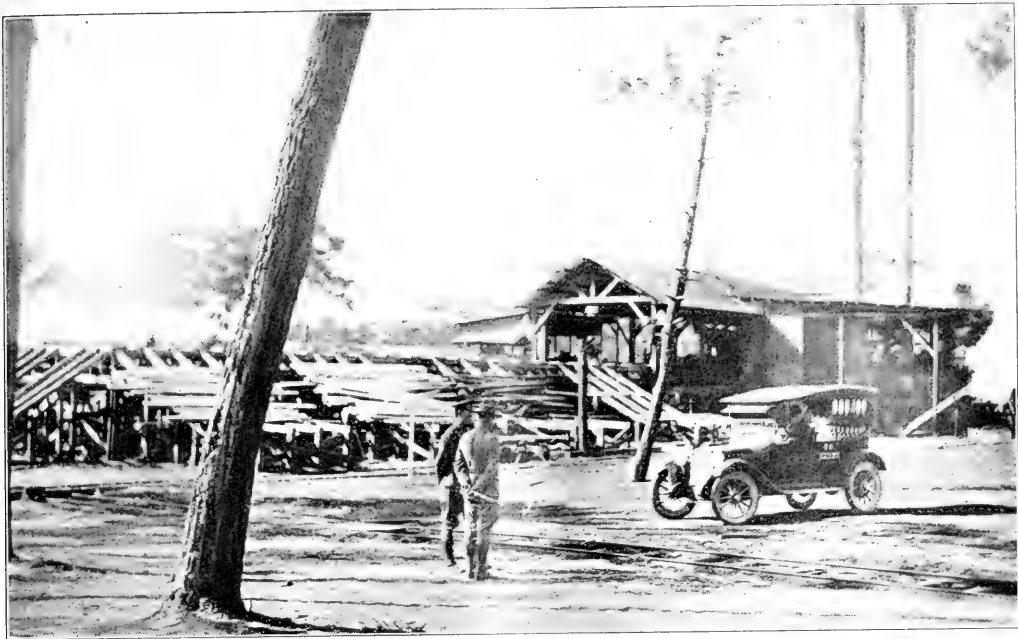
HARDWOOD LOGS DECKED NEAR MILL. LOAD OF LOGS JUST GOING TO MILL ON MOTOR TRUCK THINNED HARDWOOD FOREST IN BACKGROUND



GENERAL VIEW OF AN AMEN MILL OF THE 20th ENGINEERS IN FRANCE



A PORT LOGGING DONKEY ENGINE USED TO LET THE CARS LOADED WITH LOGS DOWN A 72% GRADE FROM THE CUTTING ON A HILLSIDE TO A 20th REGIMENT SAWMILL NEAR EPINAL, IN FRANCE



AMERICAN 20-M. SAWMILL NEAR PONTENX, LANDES. COL. BENEDICT WITH HIS BACK TURNED, IN THE FOREGROUND, STANDING NEAR NARROW GAUGE TRACK OVER WHICH LUMBER IS TRANSPORTED THREE MILES TO THE SHIPPING YARD



LOADING HARDWOOD LOGS ON LOG TRUCK IN FOREST OF CENTRAL FRANCE

when, on the afternoon of February 5, the shores of Ireland and Scotland hove in sight. But at 5:45 that evening came a bang! bang! With the crash all lights went out, due to the electric plant being put out of commission, and the ship was left in absolute darkness. The men came pouring up onto deck from their quarters, two or three decks below; flares were lighted and everybody set to work lowering the life boats. In many cases, the members of the crew assigned

to do but wait and see what would happen next. No more destroyers seemed inclined to come to the rescue of the ill-fated 700. The Tuscania listed more and more to starboard; the flares burned out, leaving the ship in darkness. The chances of those left on board grew slimmer and slimmer as the icy water crept up closer and closer to the starboard rail. Then, slowly and quietly, out of the black night a long, black destroyer slipped alongside and, by pumping overboard forty tons



SMALL TOPS BROUGHT FROM THE FRENCH FOREST TO BE PILED UP NEAR THE MAIN RAILWAY LINE FOR USE AS FUEL. THIS SCENE IS IN THE SAND DUNE COUNTRY NEAR THE COAST IN SOUTHWESTERN FRANCE

to the boats failed to put in an appearance, and the soldiers, unaccustomed to this work, had to get the boats away as best they could. Some boats were unsuccessfully launched, causing their occupants to be thrown into the icy water. After all available boats and rafts had been launched and two loads of men had been taken off in two British destroyers, which came alongside, 700 men were still left on board with nowhere to go and nothing

of oil, was able to accommodate all those left on the sinking ship."

During the long wait, one of the companies of the 20th, after seeing comrades drowned in front of them, and not knowing what was in store for themselves, stood in line in perfect order and sang "Where do we go from here, boys? Where do we go from here?"

LAGUNA MOUNTAIN RECREATION AREA

AN important new development of recreation in the open is taking place in San Diego county on the Cleveland National Forest, in California. This is the Laguna Mountain recreation area, very careful plans for which were worked out in advance by the United States Forest Service. The plans are being carried out under expert supervision, and the Forest Service has already spent about \$60,000 in the development of the area. It is situated only fourteen and one-half miles from the San Diego-Imperial Valley State highway, with which

it is connected by an excellent automobile road. It can be reached in a few hours by the people of the hot interior valleys. It has both public camping-grounds and private lots, which are leased to individuals for a term of years, thus making it worth while for the lessees to build substantial cabins. Many people are already taking advantage of the opportunity, and Laguna Mountain bids fair to become one of the best outing areas in Southern California.

THE FOREST ENGINEERS

By LT.-COL. HENRY S. GRAVES

THE Forest Engineers performed a very important service in the war. For the first time in history, it was necessary to organize military forces specially trained and equipped for work in the forest, and when the call came the foresters and lumbermen responded eagerly. There was developed an organization of splendid efficiency—a fine body of experienced men, well officered. They adapted themselves quickly to the conditions under which they had to work, and met the burdens placed upon them with a fine spirit of self-sacrifice. They had many difficult conditions to meet and many obstacles to overcome, and they succeeded in their task. They richly deserve the praise which has consistently been bestowed upon them.

The first call for foresters and lumbermen came through a request made by General Bridges, of the British Mission, soon after we entered the war, for a thousand men to work in the woods behind the British lines. To meet this request, the War Department decided to organize an engineer regiment, and asked for assistance from foresters and lumbermen in the recruiting of the force. Col. J. A. Woodruff, of the Corps of Engineers, was given the command, and his work in organizing the 10th Engineers, and later in directing all the forestry forces in France, was of exceptional merit. He has already received well earned honors in France; and American foresters and lumbermen are unanimous in their praise of his work and his leadership.

The French government also made a request through Marshal Joffre for a thousand men to help in the forests behind the French lines. It became apparent, however, very soon after the arrival of General Pershing and his staff in France, that the requirements of our own army would necessitate the use of the first forestry troops for the American armies. It was necessary, therefore, to defer giving direct assistance to the British and French. Fortunately, it proved possible to fulfill our obligations to our allies in this matter before the end of the war.

The first division of the army reached France early in the summer of 1917. There was immediate need for lumber, not only for barracks but for a great variety of miscellaneous purposes. The assistance given us by the French and British before the Forest Engineers with their equipment could arrive and begin the manufacture of lumber was very substantial, and was given at a time when both the British and French armies needed for their own uses, while battles were going on, every bit of wood and timber they could possibly secure. It was, however, at best a lean time for the American armies until the Forest Engineers could begin sawing operations.

The first battalions of the Forest Engineers arrived in France early in October, 1917. They had some of their

woods equipment with them, but it was some months before their sawmill material and all of their logging and transport equipment arrived. Pending the arrival of this equipment, they found themselves in a difficult position. There was a great need for lumber for the armies, and though the forestry troops were at first inadequately equipped, were expected to produce it. It was an inspiration to see the way the troops adapted themselves to the conditions, put in their time efficiently, produced timber which could be used for various engineering purposes, and prepared the way for the quick manufacture of lumber when the mills should arrive.

When the equipment did arrive, all of the preliminary work in the careful selection of officers and men and in the preparatory work in France began immediately to count. Every man swung into line and gave his utmost strength to the task at hand, with the result that the small portable sawmills were made to produce quantities unknown before. What seemed insuperable obstacles in the matter of transportation were overcome, and the lumber was actually gotten to the armies in time to render service at critical periods.

An important part of undertaking was the acquisition of timber and the location of operations. The French and British representatives co-operated admirably in this matter, so that any possible competition between the Allies in the procuring of material and in prices was eliminated. The corps of men engaged in this work deserve a great deal of credit. Those in charge of the negotiations had a delicate task to perform in their relations with the Allied governments. The men in the field were carefully selected from among the foresters and logging engineers, and were successful in finding bodies of timber suitable for the armies' needs.

The high quality of the personnel of the Forest Engineers has been commented upon by every one familiar with the organization. To this fact and to the able leadership of the officers in charge is due the unqualified success of the work. To set apart the names of those to whom credit is due would be to take many a leaf from the regimental muster roll, from Colonel Woodruff and Lieutenant-Colonel Greeley, the two men who carried the chief burden of the enterprise; Colonel Mitchell, who organized the 20th; Lieutenant-Colonel Kelley and Johnson, at headquarters, and Lieutenant-Colonel Woolsey and Major Moore, who negotiated the purchases with the French, through a long list of officers and men. Those who participated in the forestry work in France may well be content with their record. The forestry and lumber fraternity is very proud of what they accomplished.

ORGANIZATION OF 20TH ENGINEERS

(FORESTRY)

BRIG. GENERAL EDGAR JADWIN
DIRECTOR OF CONSTRUCTION & FORESTRY

COL. J. A. WOODRUFF
C. O., 20TH ENGINEERS & DEP. DIR. C. & F.

CENTRAL HEADQUARTERS, ENGINEERS (FORESTRY)

LIEUT.-COL. W. B. GREELEY
Chief, Forestry Section

Acquisition of Timber

LIEUT.-COL. GREELEY
MAJ. WOOLSEY
CAPT. HALL

Technical Equipment and Operation Supplies

LIEUT.-COL. KELLY
MAJ. KIEFER
CAPT. WORK
LIEUT. TAYLOR

Product and Shipment

LIEUT.-COL. JOHNSON
MAJ. GRANGER
CAPT. LAMMERS

Fuelwood Project, Advance Section

LIEUT.-COL. PECK
MAJ. STUART

CAPT. BRUCE
CAPT. KITTREDGE

Military Administration Personnel

CAPT. G. P. GRAHAM
Adjutant

Welfare

CHAPLAIN WILLIAMS

SECTION FORESTRY OFFICER
BASE SECTION No. 2

LIEUT.-COL. BENEDICT
MAJ. W. L. LaLONDE

SECTION FORESTRY OFFICER
ADVANCE SECTION

LIEUT.-COL. CHAPMAN

DISTRICTS

Pontenx
Dax

Mimizan
Lapit

DISTRICTS

Epinal
Dijon

Eclaron
Besancon

BATTALION AND DISTRICT COMMANDERS

DAX—1st Battalion,
MAJOR BROOKINGS

EPINAL—2nd Battalion,
MAJ. JOHNSON, s. o.

DIJON—3rd Battalion,
MAJOR SANBORN

MIMIZAN—4th Battalion,
CAPTAIN PHIPPS

GIEN—5th Battalion,
CAPT. LYNCH

LAPIT—6th Battalion,
MAJOR KELLOGG

CHATEAUROUX—
7th Battalion,
CAPTAIN MAAS

BAUGE—8th Battalion,
CAPTAIN VAIL

BOURG—9th Battalion,
MAJOR BARNES

BOURGES—
10th Battalion,
MAJOR HINKLEY

PONTENX—
11th Battalion,
MAJOR LAFON

BESANCON—
12th Battalion,
MAJOR KELLY

ECLARON—
13th Battalion,
MAJOR SPENCER

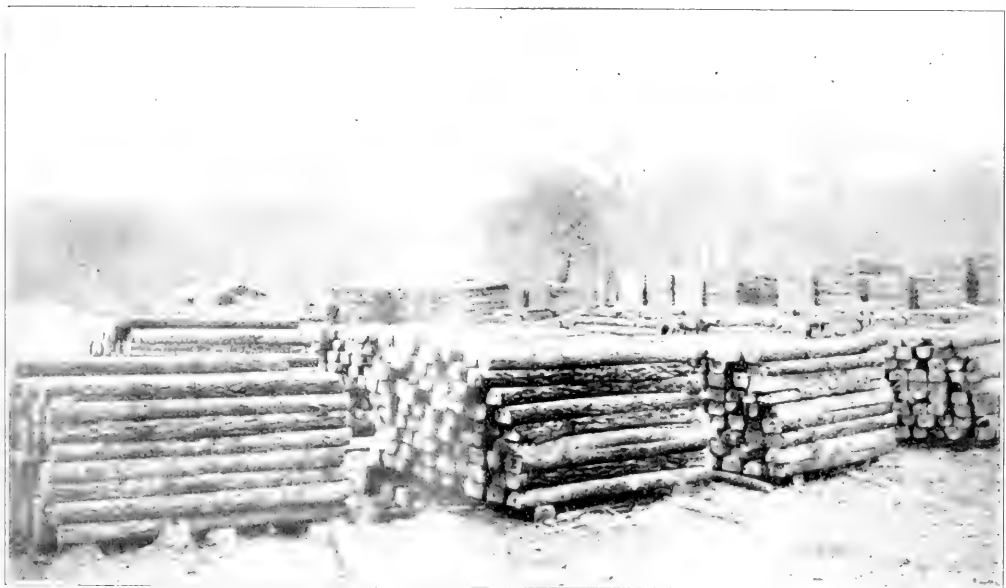
LEPUY—
14th Battalion,
MAJOR BARTELME

20th ENGINEERS (FORESTRY) RECORD OF DEVELOPMENT AND PRODUCTION

1. The 10th Engineers arrived at Nevers October 9, 1917.
2. All units of 10th Engineers arrived at their assignments by November 1, 1917.
3. The first mill to operate was a French mill which commenced sawing on November 25, 1917 at Levier (Doubs).
4. First American mill commenced on November 27, 1917, at Mortumier operation, near Gien (Loiret).
5. On December 1, 1917, 3 mills were in operation—2 French and 1 American.
6. Production in December, 1917: Lumber, 321 M.B.M.; Piling, 205 pieces; Ties, 12,031 pieces; Poles, 20,025 pieces; Logs, 33,864 pieces; Cordwood, 4,164 steres; Faggots, 1,500 steres. During December, 1917, 2 American and 4 French mills were operating.
7. 1st Battalion of 20th Engineers arrived November 28, 1917.
8. First mill of 20th Engineers commenced operation on or about January 15, 1918, at Mur-de-Sologne (Loir-et-Cher).
9. The following entries show the production by months and number of mills in operation at end of each month:
 JANUARY—10 mills operating. Production: Lumber, 1,369 M.B.M.; Piling, 740 pieces; S. G. Ties, 815 pieces; small Ties, 7,100 pieces; Misc. R. P., 29,740 pieces; Cordwood, 3,303 steres.
 FEBRUARY—21 mills operating. Production: Lumber, 2,892 M.B.M.; Piling, 720 pieces; S. G. Ties, 22,345 pieces; Small Ties, 14,856 pieces; Misc. R. P., 460,662 pieces; Cordwood, 12,433 steres; Faggots, 200 bdls.; Road Plank, 1,700 pieces; Bridge Ties, 200 pieces.
 MARCH—34 mills operating. Production: Lumber, 6,965 M.B.M.; Piling, 857 pieces; S. G. Ties, 80,099 pieces; Small Ties, 60,100 pieces; Misc. R. P., 270,496 pieces; Cordwood, 15,932 steres.
 APRIL—41 mills operating. Production: Lumber, 14,578 M.B.M.; Piling, 1,513 pieces; S. G. Ties, 152,654 pieces; Small Ties, 104,685 pieces; Misc. R. P., 334,556 pieces; Cordwood, 23,899 steres.
 MAY—48 mills operating. Production: Lumber, 18,253 M.B.M.; Piling, 11,760 pieces; S. G. Ties, 178,988 pieces; Small Ties, 122,797 pieces; Misc. R. P., 221,555 pieces; Cordwood, 47,794 steres.
 JUNE—59 mills operating. Production: Lumber, 26,727 M.B.M.; Piling, 7,576 pieces; S. G. Ties, 265,151 pieces; Small Ties, 150,359 pieces; Misc. R. P., 190,742 pieces; Cordwood, 67,500 steres.
 JULY—59 mills operating. Production: Lumber, 24,102 M.B.M.; Piling, 3,296 pieces; S. G. Ties, 298,163 pieces; Small Ties, 172,519 pieces; Misc. R. P., 227,865 pieces; Cordwood, 90,487 steres.
 AUGUST—66 mills operating. Production: Lumber, 30,601 M.B.M.; Piling, 1,934 pieces; S. G. Ties, 384,960 pieces; Small Ties, 136,143 pieces; Misc. R. P., 446,069 pieces; Cordwood, 166,339 steres.
 SEPTEMBER—80 mills operating. Production: Lumber, 30,307 M.B.M.; Piling, 3,653 pieces; S. G. Ties, 517,178 pieces; Small Ties, 133,896 pieces; Misc. R. P., 574,205 pieces; Cordwood, 144,178 steres.
 OCTOBER—81 mills operating. Production: Lumber, 29,134 M.B.M.; Piling, 6,905 pieces; S. G. Ties, 692,208 pieces; Small Ties, 106,588 pieces; Misc. R. P., 248,826 pieces; Cordwood, 151,464 steres.
10. On October 31, 1918, there were 81 mills in operation. Total strength of forestry troops in France that date (20th Engineers plus Service Companies), 360 officers and 18,183 enlisted men; aggregate of 18,543 on forestry work. No record is available as to actual status on November 11, 1918.
11. On October 31, 1918, there were actually 84 going operations.
12. On November 11, 1918, 14 district headquarters were administering the work of the forestry troops.
13. On November 1, 1917, 2 district headquarters were established, one at Pontoux-les-Forges (Landes) and the other at Levier (Doubs), Besancon taking its place.
14. On September 9, 1918, Major Benedict was named as Section Forestry Officer at Bordeaux and took over duties on October 1, 1918. On September 9, 1918, Major Chapman was named as Section Forestry Officer at Nogent-en-Bassigny (Haute Marne) and took over his duties on September 16, 1918. The headquarters of the latter were moved to Neufchateau (Vosges) on October 21, 1918.
15. All forestry units combined October 18, 1918, per G. O. 47, S. O. S. of that date.
16. Lt. Col. Greeley arrived in France August 21, 1917, accompanied by 2 officers and 9 civilians. The officers were First Lieut. Stanley L. Wolfe and First Lieut. Clarence E. Dunston; the civilians (all later commissioned) were Theodore S. Woolsey, Donald Bruce, Swift Berry, R. Clifford Hall, Ralph C. Staebner, Fred B. Agee, William H. Gibbons, Joseph Kittredge and W. H. Galleher.
17. Lt. Col. Graves and Major Moore arrived June 20, 1917.
18. Forestry Section established as a part of the Engineer Supply Office September 25, 1917.
19. Prior to September 25, 1917, Forestry Section was a part of Office of Chief Engineer, A. E. F. (Gen. Taylor).



PORTIONS OF TRESTLE BUILT BY THE 29th ENGINEERS IN THE MARITIME PINE FOREST IN THE LANDES, IN SOUTHWESTERN FRANCE TO TRANSPORT FOREST PRODUCTS FROM THE WOODS TO THE MAIN LINE



MARITIME PINE RAILWAY TIES PILED READY FOR SHIPMENT; ALSO LUMBER PRODUCED AT AMERICAN SAWMILL IN MARITIME PINE FOREST IN SOUTHWESTERN FRANCE

FRENCH FORESTS IN THE WAR

By MAJOR BARRINGTON MOORE

AFTER the first two years of the war, the tonnage shortage made it impossible to ship wood to France, except aeroplane stock and the like, for wood is very bulky and the necessary shipping would have been enormous, more than could possibly have been spared with safety. Yet wood is a military necessity.

The ports of France were not built with a view to the landing of large armies, and were wholly inadequate; yet the speedy debarkation of the troops, with their munitions and supplies, had to be assured at all costs. The submarines forced the ships to come in convoys of ten or fifteen at once, requiring several times the docking space the same number of ships would have needed singly. Wharves, miles of wharves, were of immediate necessity. For this we must have piling and wharf timbers.

But, once the troops and supplies were landed, our difficulties did not end. It was necessary to find shelter for them. Sacks of flour cannot be left out in the rain. Warehouses became necessary, warehouses of gigantic size and capacity. Railroads had to be laid in the warehouses, one depot alone requiring eighty-five miles. Lumber for these warehouses had to be furnished immediately.

Wherever possible, we billeted our troops in houses to save barracks. But the crowded condition of the country, owing to the refugees from Belgium and the invaded parts of France made this inadequate. Our men

were dying of pneumonia. We simply had to have barracks. Every suitable building that could be found anywhere in France was turned into a hospital, but yet there were not enough. We required large quantities of lumber for hospitals.

After the army was landed, its supplies cared for, and the men were in billets or barracks—in all of which wood plays the leading role—the army must be moved forward. As a matter of fact, it had to be moved forward even before the preparations for landing were completed. Everything was done under the utmost tension, and still not rapidly enough.

The transportation of men and guns, with munitions and supplies, required the construction of new railroad lines and the double-tracking of others. Ties became more important than guns, because without the railroads the guns could not be brought to the front. When the Germans broke through in March and got within close range of Amiens, they paralyzed the main artery between the French and British armies. Another railroad had to be built, and built quickly. Fortunately, the Canadians had ties ready cut for an emergency.

In order to permit one organization to communicate quickly with another, it was necessary to construct telephone and telegraph lines. This called for thousands and thousands of poles.

Cooking the food and keeping the men warm meant tons and tons of fuelwood.



A FRENCH FOREST DEVASTATED BY WAR. MILITARY WORKS VISIBLE, RIGHT CENTER

At the front, trenches and other defensive works called for large numbers of props, barbed wire pickets, and other round material.

To bring up the artillery quickly over the shell-torn ground, it was necessary to build hasty roads with five-inch plank. The amount of lumber consumed as road plank was enormous.

Add to the foregoing an insistent demand for lumber to make packing cases and for countless smaller uses, and you will have some slight conception of wood as a military necessity.

chief of the French transportation system, told us with vivid emphasis that failure to send forestry troops promptly would spell disaster. General Pershing was so anxious about the situation that he personally dictated an urgent cable asking the War Department to stop sending fighting men until they had first sent forestry troops.

But, what will be the use of sending forestry troops and sawmills unless there is enough standing timber? The vital question then was, did France possess enough standing timber to fill the indispensable requirements not only of their own army and civil population, but of the



A PORTION OF THE FIRST AMERICAN FORESTRY CAMP, WITH OFFICE TENT AND Y. M. C. A. HUT IN CENTER, LOCATED AT BELLEVUE, LANDES, FRANCE

We had not been in France long before this necessity for lumber faced us in terrible earnestness. Our Army engineers had always found at hand whatever materials they needed, and they drew up elaborate plans accordingly. The Chief of Engineers of the A. E. F. called in Colonel Graves and made him responsible for furnishing the lumber to carry out these plans. Accordingly Colonel Graves and I went to work to procure it. We knew that the tonnage shortage prevented our importing it, but we understood that the French would fill our first requirements.

What was our dismay to learn that by furnishing us lumber the French had simply meant they would furnish us the trees standing in the forests. They had no piles, and they had not enough lumber or ties for themselves. Even worse, they had no labor. What were we to do? The situation was critical. Our troops were on their way over, and we had nothing built to receive them, nor any materials with which to build. We must have forestry troops and sawmills at once. Mr. Claveille, the

British army and the American army as well? The construction program of the American engineers called for lumber in quantities which staggered the French.

Fortunately, France did have the forests. The situation was saved, the war shortened by many long months. And why did she have them? Because she had practiced forestry for generations.

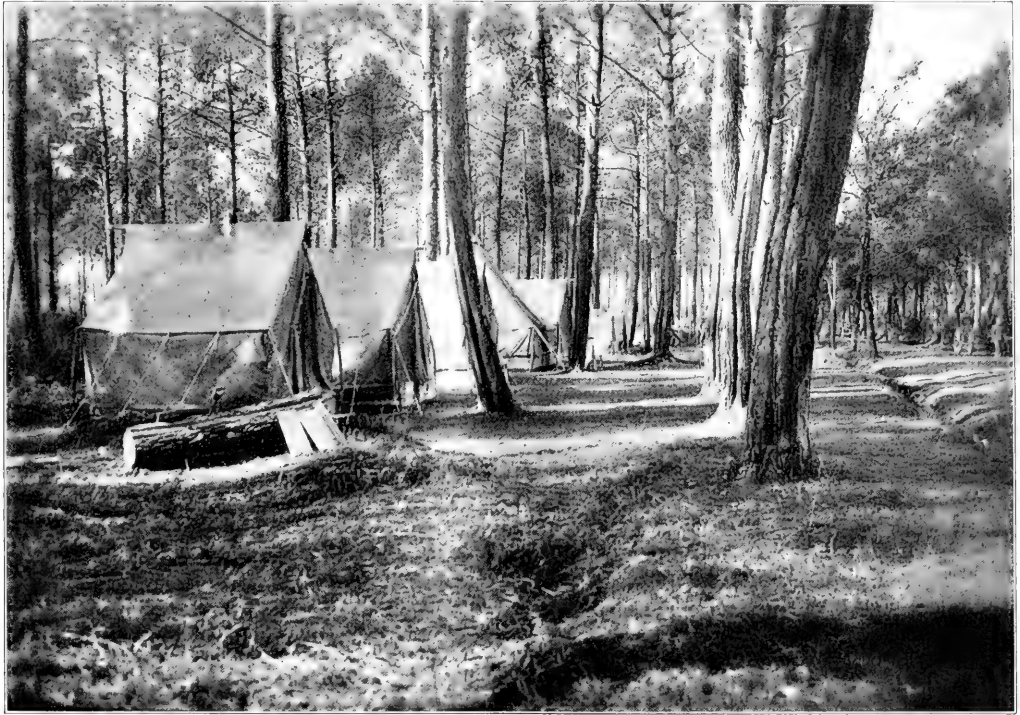
We must not imagine that she always practiced forestry. Like other countries, she began by destroying her forests. Eventually, however, she saw the disastrous effects of her recklessness, and gradually turned from destroying to restoring, and then to building up. For example, 100 years ago the southwestern corner of France, extending from Bordeaux to the Pyrenees Mountains, was almost as treeless as the prairie, and was fringed by sand dunes which were constantly in movement, burying fields and houses and even whole villages. Napoleon called in engineers and foresters. These men succeeded in holding the dunes in place by planting with maritime pine; and then they planted up

the whole interior of the region with the same tree. During the war this region was the largest source of lumber, not only for the French army, but for the British and American armies as well.

The French forests were, therefore, not simply nature's gift, but the fruit of conscious effort, applied with painstaking care and industry through long years.

Forestry to a Frenchman is the accepted way of handling forests. He cannot conceive of handling woodlands

timber that was ready to be cut, and even to sacrifice that which they would not normally have cut for ten or fifteen years. But they were firm against annihilating any forest, or cutting it in such a way that it could not recover with reasonable care. They, therefore, maintained absolute control over the methods of cutting. On the government owned forests, they were particularly strict, marking every tree to be cut and prescribing in detail the methods of brush disposal, etc. On private



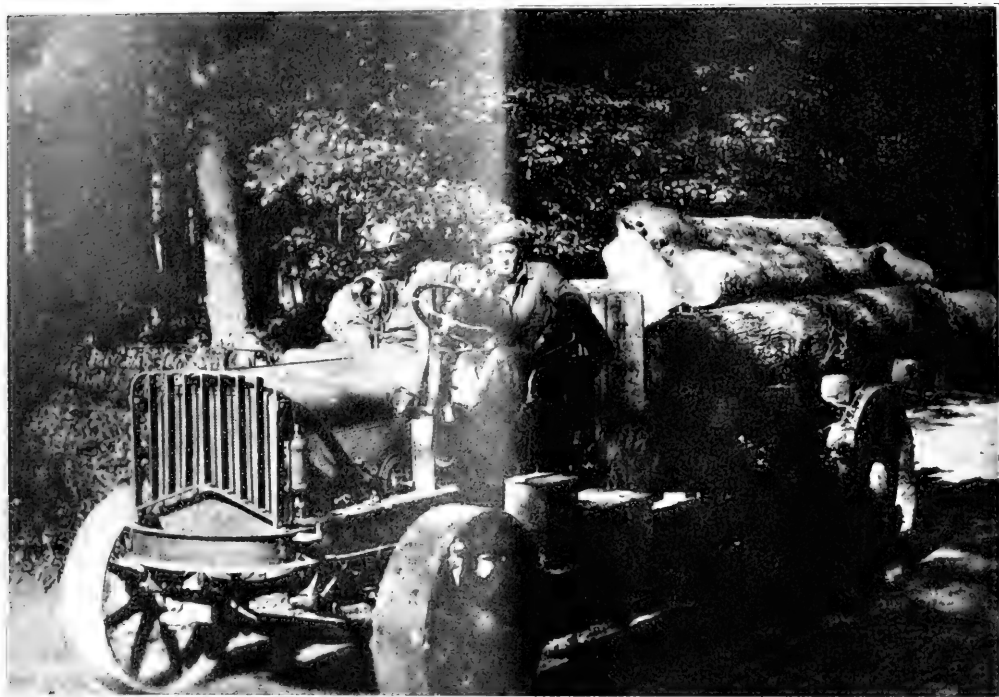
THE OFFICERS' ROW AT BELLEVUE CAMP, LANDES, FRANCE, THE FIRST CAMP OF THE AMERICAN FORESTERS AND LUMBERJACKS

in any other way. In France everybody, even those who are not foresters or lumbermen, understands what forestry means. When you say you are a forester you don't have to stop and explain as you do in America. It is just as clear as if you said you were a lawyer or a doctor. This universal understanding of the aims of forestry is the most potent factor in the upbuilding of the forest resources of any country. It is to the interest of the lumberman to have a perpetual supply of timber to cut; it is to the interest of the wood using industries to have a permanent source of raw material; and it is to the interest of the country as a whole to be independent of outside sources of supply.

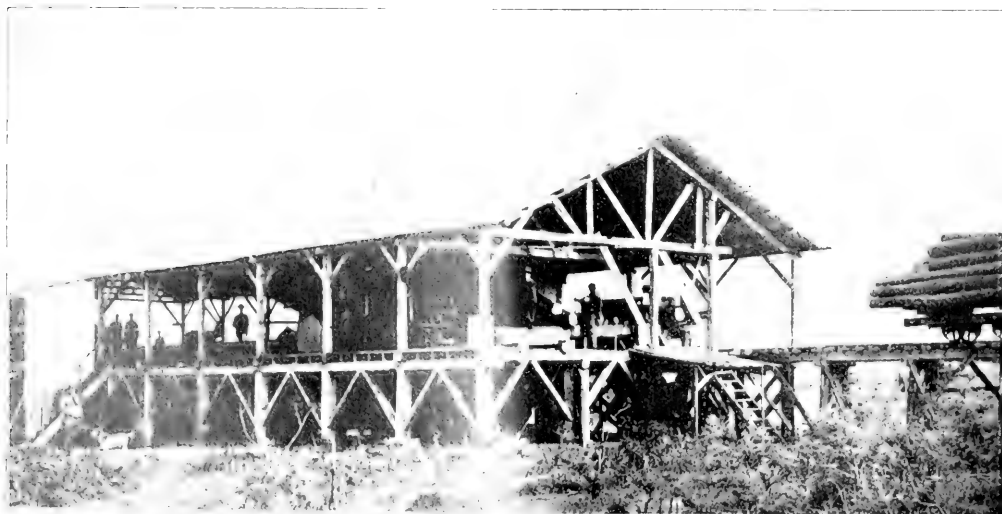
No wonder, then, that the French valued their forests, and were unwilling to have them needlessly destroyed. They did not forget the years of toil they had spent in creating them. They were willing to give up all the

lands the owner marked or designated in the contract those trees which he would sell. He also laid down the manner of brush disposal and other operations. Ultimate control was vested in a committee composed of representatives selected by the Minister of Agriculture, the Minister of Munitions as well as all other interested members of the cabinet, and representatives of the lumber industry. Under these conditions we had little choice as to methods of cuttings.

The operations were uniformly well carried out. The stumps were cut so low you could hardly see them; the tops were chopped into cordwood, and the slash thoroughly cleaned up. The cutting areas of the Canadians and Americans were generally better than those of the French wood merchants themselves. This goes to show that the lumberman can cut under forestry methods when he has to. He can do it even when subjected to the



LOAD OF HARDWOOD LOGS ON A WHITE TRUCK ON THE WAY TO ONE OF THE SAWMILLS OF THE 20th ENGINEERS



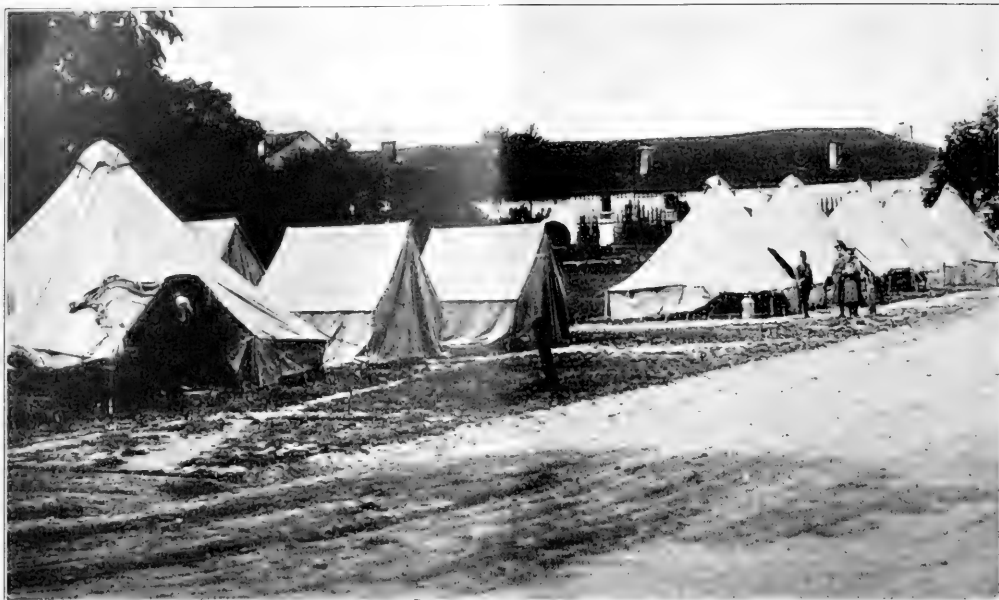
A 20th AMERICAN SAWMILL OF THE 20th ENGINEERS. SOME OF THESE MILLS WORKED NIGHT AND DAY TO SUPPLY THE DEMANDS OF THE A. E. F. FOR LUMBER



LOAD OF LOGS WHICH HAS JUST BEEN LOWERED DOWN A STEEP INCLINE. THE CABLE BY WHICH THE CAR OF LOGS HAS BEEN LOWERED IS SEEN BETWEEN THE RAILS AT THE RIGHT.



INTERIOR OF 20th ENGINEERS SAWMILL IN FRANCE



CAMP OF A DETACHMENT OF THE 23d ENGINEERS IN SOUTHWESTERN FRANCE, SHOWING OLD STYLE FRENCH FARMHOUSE IN THE BACKGROUND

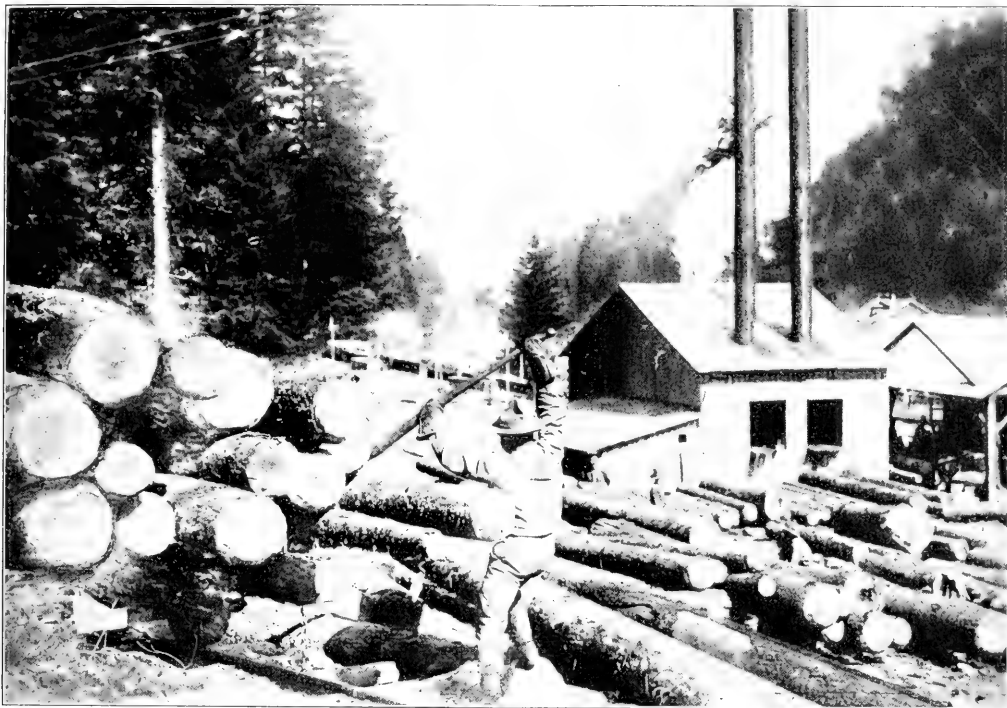
greatest imaginable pressure for quick production; and what is more, he does it well.

The organization of the American forestry section was patterned largely after that of the Canadian Forestry Corps. When Colonel Graves and I landed in France in June, 1917, we went first of all to the British Forestry Directorate at LaTouquet. Gen. Lord Lovat received us with the greatest friendliness, and gave us complete data which he had prepared in advance, covering his entire organization and equipment. Then, after a trip to the Canadian operations under Colonel Johnson on the government forest of LaJoux, in Eastern France, and after working over the information collected, we drew up a cable outlining the organization of the forestry troops required by the A. E. F. We based our requirements on an army of two million men, and asked for 18,000 forestry troops, of which 7,500 were to be skilled lumbermen, about 4,500 engineer troops for road and camp construction, and about 6,000 unskilled labor. At the same time we requested twelve officers to come over at once for overhead organization. These officers we asked for by name. They arrived in about two months, in time to be of great service in acquiring standing timber and other preparatory work. The unit of the Canadian Forestry Corps is the company. We made ours the battalion on account of our army regulations; it was hard at first to make our superiors see the need for elasticity. Forestry troops were an entirely new venture. The number of men in the actual operations depended entirely upon the needs of the case. Sometimes only 50 men would work together, and then again, we would have a thousand or more.

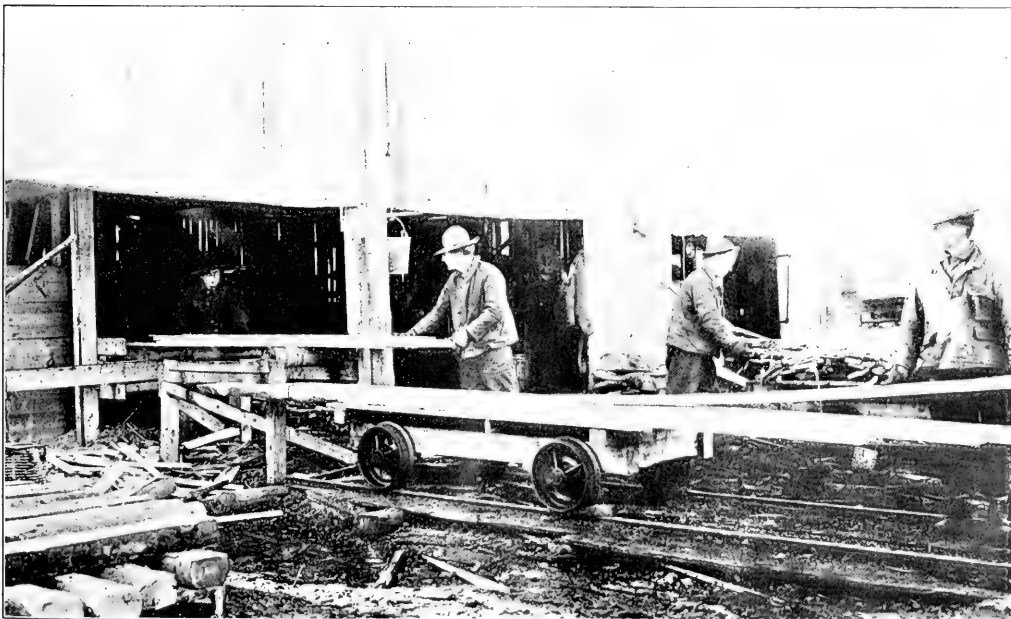
The standing timber was all bought through an inter-allied committee composed of French, British and Americans; later the Belgians were represented. We ourselves selected each forest, in company with a French officer, and then laid it before the committee. The negotiations with the owner, and purchaser, were done by the French. The French possessed the right of requisition, and used it effectively, saving millions of dollars and defeating the swarms of speculators which buzzed around us like flies around the honey pot. By persistent efforts we managed to acquire timber enough to keep ahead of the operations. But toward the end it was becoming more and more difficult to find reasonably accessible tracts. Accessibility was of prime importance in selecting timber, because of the need for rapid production. If the war had lasted, we would have been in a difficult position. When it ended, we were planning to do railroad logging in the mountains.

Logging conditions varied greatly. The southwestern pineries are as level as a table, except for the dunes along the edge. Central France is level or rolling, the chief obstacle being the heavy, sticky clay. Here the forests were mostly oak, which we cut into ties and road plank. The silver fir forests of Eastern France were in the mountains. Our chief trouble there was the narrow gauge railroads, which never had enough cars or engines. The same kind of narrow gauge railroads bothered us in other regions as well.

Last autumn, before the armistice was signed, our War Department planned to have four and a half million men in France by July, 1919. This meant an enormous increase in the lumber requirement. To meet it, we planned



UNLOADING LOGS FROM RAILWAY CAR AT AN AMERICAN SAWMILL.



REMOVING LUMBER FROM TAIL END OF AMERICAN SAWMILL.

to bring over 24,000 additional forestry troops, or a total of 42,000 men, 2,000 of which were to cut for the French and British. The men were already being recruited when hostilities ceased. Whether or not France could have furnished the timber for this force, as well as for the British and French armies, is difficult to say. Certainly we would have been hard put to it, and been compelled to operate some very difficult tracts.

We had to get ready cut lumber, ties, and piles for immediate needs pending the arrival of the forestry troops. We had to continue getting this class of material even after the arrival of the forestry troops, because the War Department increased the numbers of fighting men beyond what we had anticipated when we drew up the organization of the Forestry Section. The British and French helped us in this with wonderful generosity, giving us material from stocks sorely needed for their own armies. We developed to their utmost all European sources, Switzerland, Portugal, and even Spain. This

was so great that England cut down her importations of food to get tonnage to bring men over. The people went without sugar, they went without butter and other fats, they had almost no meat and a miserly slice of bread each day. They reduced themselves to the verge of starvation just to get a few more ships to bring soldiers to France. Had it not been for the forests of France, these ships, yes and even more ships, would have had to bring lumber instead of men.

We have seen, then, that wood is a military necessity, and that, owing to the shortage of ships, we could not have sent the necessary men and guns to France if there had not been the French forests to supply the wood. We have also seen that these forests are due to the efforts and industry of skilled foresters backed by the people.

In concluding, I wish to take this opportunity of expressing my profound admiration of the Canadian Forestry Corps, and deep appreciation of their generous and unflinching assistance. A finer lot of men I never hope



GENERAL VIEW OF ONE OF THE 20th REGIMENT SAWMILLS

last was the work with which I personally was most concerned after the arrival of the forestry troops.

When we consider that the modern army is helpless without wood, I think it is safe to say that the French forests were one of the big factors in winning the war.

Had not the standing timber been in France to cut, it would have been useless to send forestry troops, and we would have been compelled to use precious tonnage in bringing the wood to our armies. We all know how critical the situation was during the German drives from March to July. Every man and every gun was needed. The drive in March was checked by a handful of men who had never fought before, laborers, camp cooks, any one who could hold a rifle. The need of men and guns

to meet. When Colonel Graves and I landed in Bordeaux in June, 1917, wholly ignorant of what lay before us, Colonel Miller, in charge of the Canadians in the region, called upon us and not only extended to us every courtesy but gave us much valuable information. I have already spoken of the assistance we received in drawing up our organization. Colonel White was particularly helpful with friendly counsel. When our forestry troops had arrived but were unable to commence sawing because our mills had not yet come, General MacDougal lent us five Canadian sawmills, three of 20,000-foot and two of 10,000-foot capacity, with full equipment. I feel that I speak for all the American lumbermen and foresters in France when I say that we can never adequately repay our debt of gratitude to the Canadians.



A GROUP OF OFFICERS OF THE 20th ENGINEERS (FORESTRY) IN FRANCE



CAMP OF A DETACHMENT OF THE 20th ENGINEERS (FORESTRY) IN CENTRAL FRANCE



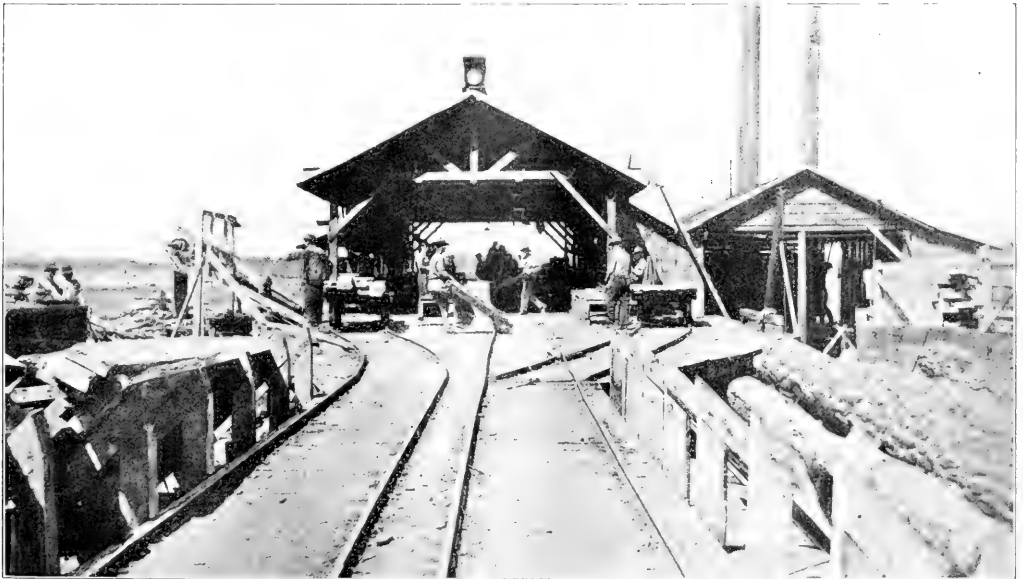
CAMP OF DETACHMENT OF 20th ENGINEERS IN FRANCE. CREW STARTING TO WORK



20th ENGINEERS IN FRANCE HAULING A SPRUCE TREE FULL LENGTH BY MEANS OF BIG WHEELS FROM WOODS TO MILL. OAK COPPIC AT THE SIDES OF THE ROAD.



OFFICERS OF THE 20th REGIMENT POSING FOR THEIR PHOTOGRAPHS AT A LUMBER CAMP IN FRANCE



THE AUREILHAN 20-M AMERICAN SAWMILL NEAR PONTENX, LANDES, FRANCE, SHOWING THE SYSTEM OF TRACKS UPON WHICH THE TIMBER AND LUMBER ARE REMOVED FROM THE MILL TO BE LOADED DIRECT TO THE BROAD GAUGE RAILWAY CARS



AMERICAN FORESTRY TROOPS CUTTING SPRUCE TREES IN A PARK IN FRANCE



A LOADED AMERICAN LOG WAGON ON ITS WAY FROM THE FOREST IN FRANCE TO A 20th REGIMENT SAWMILL



HAULING LOGS BY HORSE POWER FROM THE WOODS TO ONE OF THE 20th REGIMENT SAWMILLS IN FRANCE



LUMBER YARD AT THE BOURICOS AMERICAN 20-M SAWMILL NEAR PONTENX, LANDES MARITIME PINE FOREST SHADES THE CAMP IN THE BACKGROUND AT THE LEFT



20th ENGINEERS SAWING FELLED TREES INTO LOGS IN A PINE FOREST, SOUTHERN FRANCE



20th ENGINEERS LOADING FIR LOGS ON NARROW GAUGE RAILWAY CAR IN THE MOUNTAINS OF EASTERN FRANCE



AMERICAN LUMBERJACKS AND FORESTERS LOADING LOGS ON TO AMERICAN LOG WAGON IN CENTRAL FRANCE



20th ENGINEERS LOADING LONG PILING FOR SHIPMENT FROM EASTERN FRANCE TO BASE PORTS ON ATLANTIC COAST TO BE USED IN DOCK CONSTRUCTION



20th ENGINEERS SKIDDING AND PEELING POLES IN A FRENCH PINE FOREST IN SOUTHWESTERN FRANCE



LOADING FOREST PRODUCTS ON TO FRENCH RAILWAY CARS IN THE HARDWOOD FORESTS OF CENTRAL FRANCE



A 20th REGIMENT SAWMILL UNIT CAMPED IN A HARDWOOD FOREST IN CENTRAL FRANCE



LOG BOOM IN AUREILHAN LAKE IN THE LANDES, FRANCE. THE AMERICAN SAWMILL LOCATED AT THIS POINT MADE AN UNUSUALLY GOOD RECORD IN PRODUCTION AND SHIPMENT



BRINGING SPRUCE AND PINE LOGS INTO AMERICAN MILL IN FRANCE. LARGE HEAP OF SAWDUST RIGHT CENTER. SAWDUST SEEN COMING FROM THE BLOWER PIPE



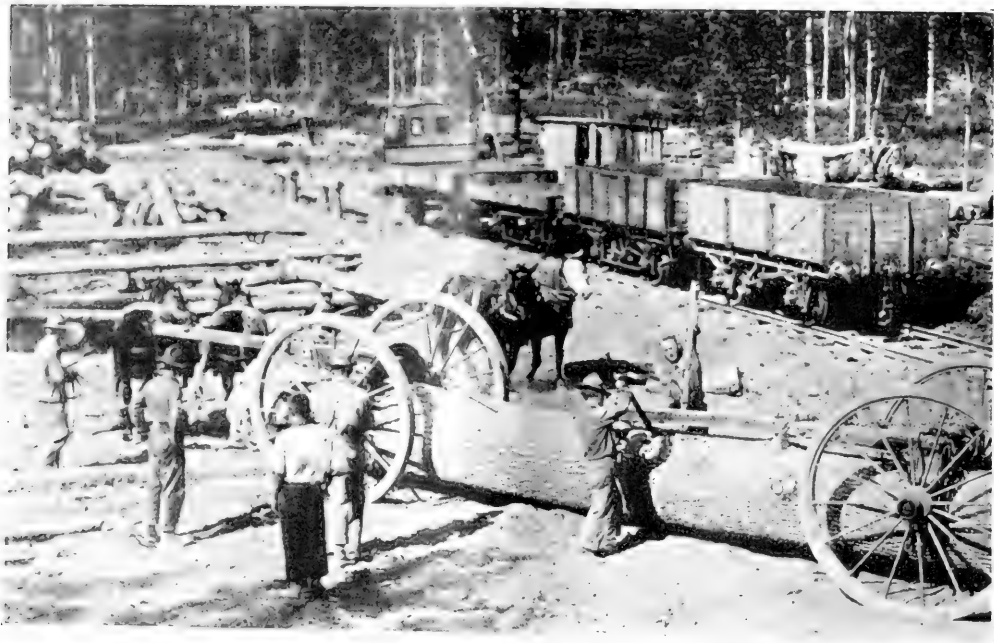
A LARGE LOAD OF MARITIME PINE LOGS ON A MOTOR TRUCK OF THE 20th ENGINEERS (FORESTRY) IN FRANCE



20th ENGINEERS LOADING LUMBER AND TIES ON FRENCH CARS. THE CAR AT THE LEFT IS LOADED WITH BARBED WIRE STAKES. THE BUILDING AT THE END OF THE RIGHT-HAND CAR CORRESPONDS TO AN AMERICAN CABOOSE



TYPE OF WAGON USED BY THE AMERICAN FORESTRY ENGINEERS IN FRANCE. NOTE THE SIZE OF THE LOAD



TWO PAIR OF BIG WHEELS USED TO BRING A LONG HARDWOOD LOG TO A MILL IN CENTRAL FRANCE



A LARGE SAWMILL OF THE 20th ENGINEERS CUTTING HARDWOOD LOGS IN FRANCE



LOADING SOME OF THE MANY THOUSANDS OF TIES MADE BY THE 20th REGIMENT MILLS FOR THE A. E. F. OPERATIONS IN FRANCE



A LARGE AMERICAN SAWMILL IN A FRENCH HARDWOOD FOREST



LOADING PEELED POLES ON TO RAILWAY CARS AT ONE OF THE OPERATIONS OF THE 20th ENGINEERS



THESE YOUNG LUMBERJACKS ARE THE TYPE OF SKILLED, ENERGETIC WORKERS WHO MADE RECORD PRODUCTION POSSIBLE



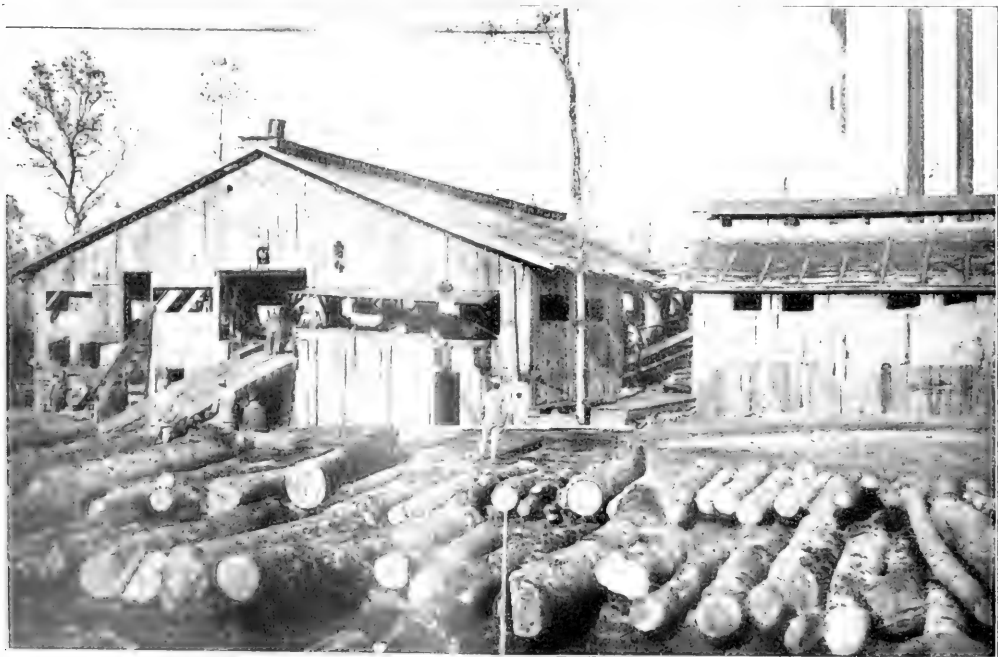
20th ENGINEERS LOADING FIR LOGS IN THE MOUNTAINS OF EASTERN FRANCE



UNLOADING SMALL LOGS AT AN AMEX MILL IN CENTRAL FRANCE. NOTE THE SPOUT THROUGH WHICH THE SAWDUST IS BLOWN TO LARGE SAWDUST PILE AT THE LEFT



MEMBERS OF THE 20th ENGINEERS LOADING PILING ON TRUCKS AT LANDING No. 2 IN FRANCE. THESE PILING ARE APPROXIMATELY SEVENTY FEET LONG



THIS WAS ERCTED BY THE 20th ENGINEERS NEAR ST. DIZIER AND SURPRISED THE FRENCH WITH ITS LARGE DAILY PRODUCTION, AS IN FACT DID ALL THE OTHER MILLS

HOW THE AMERICAN ARMY GOT ITS WOOD

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

YOUR part in winning the war has been as important as that of any other troops in the American Expeditionary Forces."

This was the high commendation given right after the signing of the armistice to the foresters and lumbermen who had gone to France to get out the lumber needed by the American Army. It was contained in a general order issued by Col. J. A. Woodruff, "To the Officers and Soldiers of the 20th Engineers and Attached Service Troops." Colonel Woodruff was placed in command of the 10th Engineers (Forestry) when that regiment was organized shortly after the United States entered the war; and later of the combined Tenth and Twentieth, Foresters and Lumbermen, when they were united into what constituted the largest regiment the world has ever seen. Its total strength just before hostilities ceased was 360 officers and 18,183 enlisted men, an aggregate of 18,543 men engaged in the production of lumber for the American Army.

General Pershing had scarcely landed in France before he realized that great quantities of lumber were necessary for the army which was preparing to follow. The shortage of shipping at that time due to the submarine campaign made it impossible to ship the lumber from this country. Fortunately, France had the timber, although she did not have the men who could cut it for any forces other than her own. Accordingly, General Pershing sent an urgent cable to the War Department calling for lumberjacks and foresters to constitute a force of trained men who could get out an immense monthly supply. He said in effect that it would be useless to send fighting men unless they could be supplied with lumber and that forestry troops should be sent first. Docks, warehouses and railroads had to be built, and wood was needed for a hundred other purposes.

The War Department, therefore requested the Forest Service to assist in the formation of a forest regiment. This was the beginning of the 10th Engineers, composed

of two battalions of three companies each, which it was thought at first would be sufficient for the purpose. Plans for the organization of this regiment began in the early summer of 1917, shortly after the United States entered the war. Trained foresters and lumbermen were gathered from all parts of the country. Through its district representatives, the Forest Service was able to reach the operators and the lumber companies, the sawmill owners and the loggers, who had men skilled in all branches of the profession. Graduates and students of the forestry schools enlisted. These men came to the

American University Camp which was established at Washington, District of Columbia, in the midsummer of 1917; and in the beginning of September were on their way to the other side. They arrived in France in the early days of October, and were all at their assignments by the first of November.

In the meantime plans for sending over a much larger army than had been anticipated and for shipping the troops with the greatest possible speed, necessitated the formation of another forest regiment. This was the 20th Engineers, the first two battalions of which were ready to proceed to France early in November, while the others kept following as fast as they were organized until March, 1918. Another regiment was being formed

at the time Germany quit. The 20th Engineers was commanded by Col. W. A. Mitchell, like Colonel Woodruff, a regular army officer and a West Point graduate, whose previous services fitted him admirably for this work. Colonel Mitchell later was transferred to the 2d Engineers, known at the front as the "Fighting Engineers," and was cited for bravery. When the 10th Engineers and the 20th Engineers were combined into one regiment, Colonel Woodruff took command of the united force.

The American foresters and lumbermen knew that they had their work cut out for them when they arrived in France, but they were impatient to get on the job. Originally it was figured that they would have to get



LIEUT. COL. GRAVES IN FRANCE

The Chief Forester of the United States went abroad shortly after this country entered the war to organize the work the American foresters were to do in helping to get out the timber needed for war purposes.

out about 25,000,000 feet of material a month; but these figures kept mounting until in September, 1918, they turned out 42,000,000 board feet, while for the six months ending with March, 1919, in preparation for the big spring drive which would have started then if the war had not ended when it did, the schedule called for a stupendous total of 450,000,000 feet of lumber for the American Army.

When the 10th Engineers was formed it was the first time a United States army had organized and equipped troops for systematic forest engineering. Immediately after the need became known, Henry S. Graves, Chief Forester of the United States, with the rank of major in the Reserve Engineer Corps, went to France to prepare for the forestry work there and to make arrangements for the acquisition of cutting rights in the French forests. Later Major Graves was commissioned a lieutenant colonel. With him went Capt. (later Major) Barrington Moore. They landed in France in June, 1917; and before Colonel Graves left France in January, 1918, the 10th Regiment and a considerable

portion of the 20th Regiment also had arrived and were producing wood and lumber for the American Army.

Two months after Colonel Graves reached France he was followed by Wm. B. Greeley, Assistant Forester, United States Forest Service, who had been commissioned a major on the regimental staff of the 10th Engineers in this country, but who was needed to take charge of organization work in France. Later he was promoted to the rank of lieutenant colonel and made chief of the entire forestry section under Colonel Woodruff, and in April, 1919, was decorated by the French with the Legion of Honor. Colonel Greeley was accompanied by two officers, First Lieutenants Stanley L. Wolfe and Clarence E. Dunston, and nine civilians, all of whom later were commissioned. These men were Theodore S. Woolsey, Jr., Donald Bruce, Swift Berry, R. Clifford Hall, Ralph C. Staebner, Fred B. Agee, William H. Gibbons,

Joseph Kittredge and W. H. Gallagher.

Major Woolsey, who was in April, 1919, made a lieutenant colonel, became a member of the executive com-



COL. W. A. MITCHELL, U. S. A.

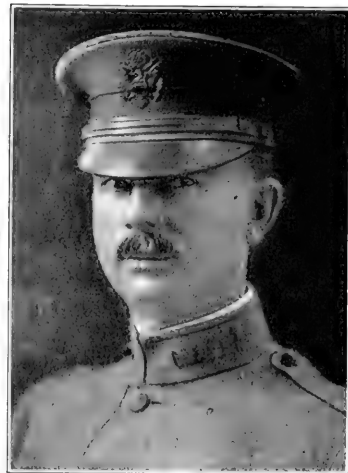
First Commander of the 20th Engineers, who, upon his arrival in France, was transferred to the 2nd Engineers.



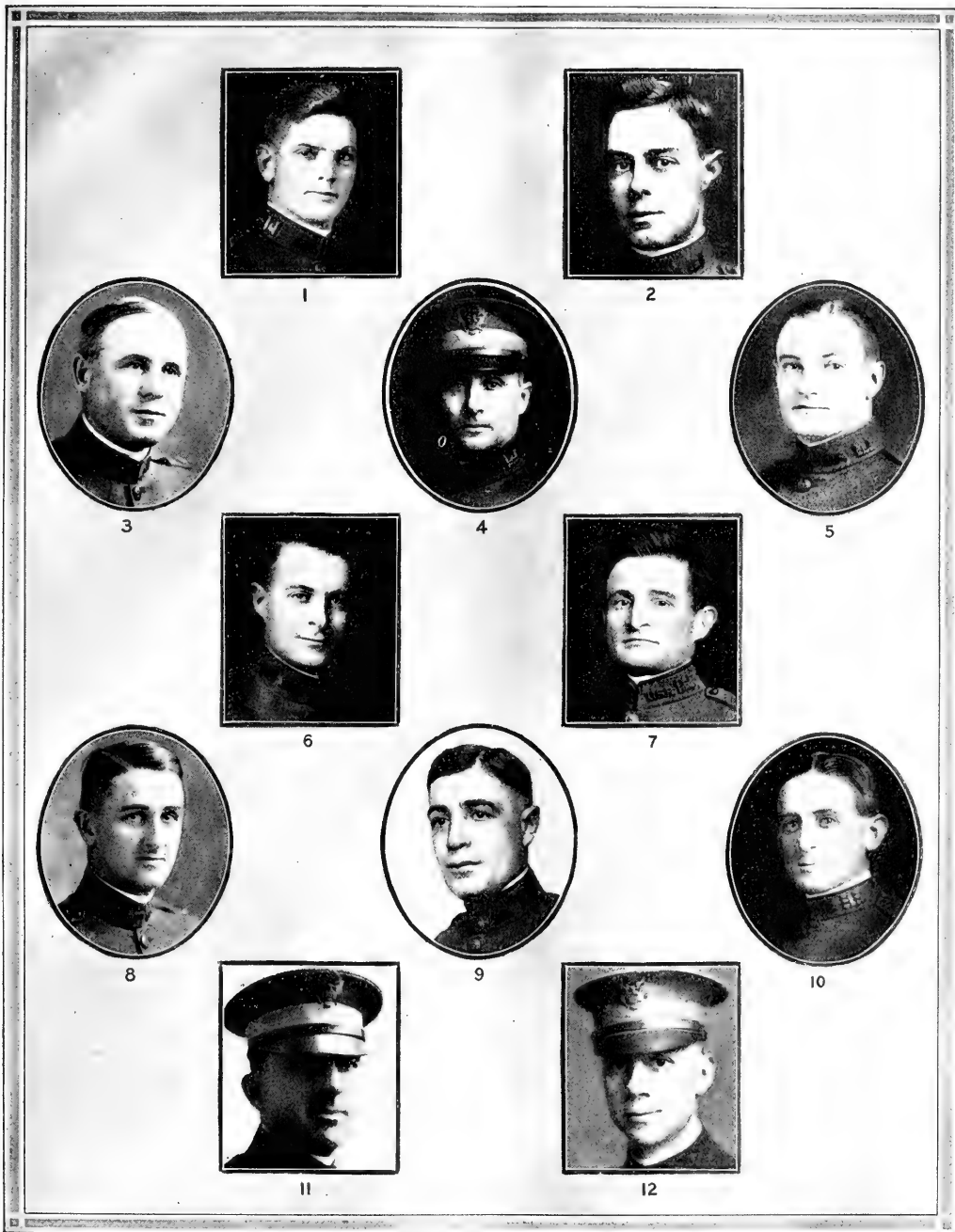
MAJOR S. O. JOHNSON
20th Engineers



MAJOR JAMES E. LONG
20th Engineers



THE LATE MAJOR F. E. HARTWICK
20th Engineers



Photograph by Harris and Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FORESTRY)

1. 1st Lt. Paul D. Mackie. 2. 1st Lt. Lester W. Jacobs. 3. Major Collin E. Clark. 4. Capt. F. R. Barnes. 5. Capt. Ralph H. Faulkner. 6. Capt. George G. Steel. 7. 1st Lt. Milton Pittman. 8. 2nd Lt. Harry G. Miller. 9. 1st Lt. Frederick B. Judge. 10. 1st Lt. Gilbert C. Eastman. 11. 2nd Lt. Fred A. Roemer. 12. 2nd Lt. Julius A. Herbolt.

mittee of the Comité Interallié de Bois de Guerre, which was organized before Colonel Graves returned from France to avoid competition among the British, French and American armies in the purchase of timberland. Captain Bruce and Captain Kittredge served under Lieutenant Colonel Peck in the fuelwood project in the advance section. Capt. R. Clifford Hall served under

F. R. Barnes, of Missouri, the 9th; and Major P. E. Hinckley, of Maine, the 10th.

"We are here, and mighty darned glad that we are; we are busy as beavers, and are going to do our bit and then some in this war." This is what Capt. John D. Guthrie, of the 20th Regiment, Engineers, wrote home shortly after his arrival in France.

That was the spirit which pervaded the entire regiment of foresters and lumbermen. Their only complaint was that they could not get into the actual fighting. Every one of the more than 18,000 who were in the regiment at the time the armistice was signed had been anxious to get to the front. Any one of them would have jumped at the chance any time it had been offered. Some of them came very near getting there shortly after the big spring drive of the Germans began in 1918. Plans were on foot to mobilize every available man in the Service

of Supply for service at the front, but the crisis passed without making this action necessary.

The fact, however, that they did not get into the active military end of the game does not detract in the least from the invaluable service they rendered. In the highest sense it was of the greatest military importance, for the army could not have moved forward or maintained



MAJOR P. E. HINKLEY
Commanding 10th Battalion, 20th Engineers

20th Regiments any special training in forestry or lumbering methods before they left the United States, for they were picked men, chosen because of their proficiency in their special work, while the clerical force was selected because of their actual knowledge of keeping lumber accounts and similar information. So during their stay at American University Camp the men were given what military drill was required for administrative and disciplinary purposes. Colonel Graves reports one of the men to have remarked after they got to the other side: "We're not much on drill, but we're hell on cutting down trees." After they landed in France a large part of their actual military equipment was left behind at the various supply stations. As a rule they took with them to their camps about one-tenth of their guns.

The 1st and 2d Battalions of the 20th Engineers, under command of Major Hartwick, of Detroit, and Major S. O. Johnson, of California, sailed in December, 1917; the 3d and 4th, under command of Major R. A. Johnson, California, and Major George H. Kelly, Oregon, sailed the first week in January, 1918; and the other battalions followed at approximately three-week intervals, with Major Frederick Kellogg, New York, in command of the 5th; Major Benjamin F. Wade, of New Jersey, the 6th; Major C. E. Clark, of North Carolina, the 7th; Major George W. Weisel, of Montana, the 8th; Major



MAJOR F. M. BARTELME
Commanding 11th Battalion, 20th Engineers

itself without the endless streams of lumber which were turned out. It is almost impossible to exaggerate the value of wood supplies as a factor in military operations.

In the general order which he issued after the signing of the armistice, Col. Woodruff, after declaring that the army at that time was "well supplied with lumber," added:

"When ties were called for in large quantities to support the advances of our troops at St. Mihiel and in the Argonne, they were ready. At practically every dock project, deliveries of piling and lumber were well ahead



COL. H. L. BOWLBY
Former Regimental Adjutant, 20th Engineers

of the construction. In other words, the Forestry Troops have made good on the work for which they were brought to France."

When these men left for France their friends knew they would make good. With what a vengeance they would fulfill these expectations and what remarkable records they would make in spite of countless and constant handicaps, could hardly have been dreamed of in advance. But these stalwart sons of America, hardy woodsmen and sturdy sawmill operators, went into the fight with the same grim determination that inspired their fellows at Belleau Wood and Chateau Thierry, at St. Mihiel and in the Argonne. They wanted to go to the front but could not. But they failed in no task that was assigned to them; in fact, they did more than was asked of them and smashed record after record in their keen rivalry to help crush armed autocracy. They put up a winning fight which will stand among the brilliant achievements of the war on the pages of history.

Both with the French mills, old-fashioned and man-driven, which they were compelled to operate when they first arrived, and to some extent even up to the end, and with the modern American mills which arrived later, the lumbermen began from the day of their first cutting to hang up one record after another with patriotic regularity. Mills which were rated at 10,000-foot capacity in a ten-hour day were sent throbbing ahead full speed and made to turn out 25,000 and 30,000 feet a day, with shifts working night and day in most instances. One 20,000-foot mill made the



MAJOR E. H. MARKS

that the men of the 20th showed their prowess, their ability to surmount almost insuperable difficulties and to work under conditions which were entirely new to them.

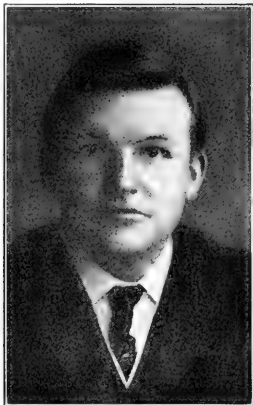
The incident—if such it should be called—might be related of how on one occasion a 10,000-foot mill was moved a distance of twenty-five miles and in forty-seven hours from the time it stopped buzzing in its original

location was sawing logs in the new section of woodland. Five days had been allowed as a reasonable time for moving this mill. Such feats were not rare occurrences, and similar ingenuity and ability to meet emergencies were shown by the forest regiment many times during its stay in France.

These men had gone over to France for a purpose and they were not to be stopped by difficulties and obstacles. If they did not find the facilities which they needed at hand, they turned in and manufactured them from whatever material was available. In the early days particularly they had to



MAJOR B. F. WADE



LT. COL. C. S. CHAPMAN

resort to all sorts of ingenious expedients. There was urgent need of supplies for the American army, which was beginning to pour over rapidly. The men of the forest regiment knew this,

and they were not going to allow their "buddies" in the infantry and artillery to suffer for lack of barracks and warehouses and hospitals, if there was any way under God's heaven to prevent it. And so American ingenuity was put to the test, and it came out on top. If horses had not yet arrived, the men formed themselves into teams and dragged out the logs by man-power. If the horses arrived before their harness, pieces of burlap and bagging, rope and nails were "composed" into some of the most picturesque harness the world had ever seen. It is probable that the horses themselves had many a chuckle over some of the ludicrous outfits to which they were fitted. Of course, they were too polite to do this before the men, but when they were in their stalls for the night they must have laughed heartily, and probably have carried on a conversation which would have given Kipling fine material for a new animal story.

The officers and men of the forest troops had to improvise in many ways, even to language. Here is what Sergeant Oliver M. Porter, Yale Forest School '15, who was out buying cordwood supplies for the A. E. F., wrote back to the States on that subject. He says: "I hardly know my mother tongue. Speech with me has become an unrecognizable mixture of English, French and Span-



MAJOR A. W. CORKINS

high-water mark of the war when the 27th Company in 23 hours and 35 minutes cut 177,486 feet of lumber.

It was not only in production but in many other ways

ish, since I have to deal with American soldiers, French civilians and Spanish contract labor. Also I am learning how to talk with my hands, arms, shoulders and feet. Actions speak louder than words, especially where you don't know the words."

Another handicap which the Americans had to overcome was that, being the last on the ground, they had the longest hauls to make. The English forest regiments operated in a comparatively small semi-circle up in the northern part of France; the French in a somewhat wider area back of this, with Paris as the center; but the Americans had to swing around on a much longer circumference, reaching from the ports of Brest, St. Nazaire and Bordeaux on over through the central southern part of France and up into the Vosges and Argonne section. This called for the building of many miles of railroad, at the Eclaron plant alone, for instance, eight miles of standard gauge and twenty-five miles of two-foot gauge railroad being constructed. The wood cutting did not cease with the signing of the armistice; and up to February 1, 1919, the forest regiment had to its credit 205,000,000 feet of sawed lumber; 2,998,000 standard gauge and 941,000 narrow gauge ties; 1,746,378 pieces of round products; 39,595 pieces of piling and 319,057 cords of fuelwood.

Some of the mills were close to the front, others hundreds of miles away. The mill at Ancemont, to mention one of a number, was operating at the time that town was bombarded; and this mill, which was four or five miles back from the line, was moved to Ippecourt, in the Argonne section. Among other mills close to the front were those at Menil and at La Tour.

One month after the first forestry troops had reached their assignments in France they had three mills in operation, two of them French and one American. This was on December 1, 1917. The first American mill had begun operations on November 27 at Mortumier, near

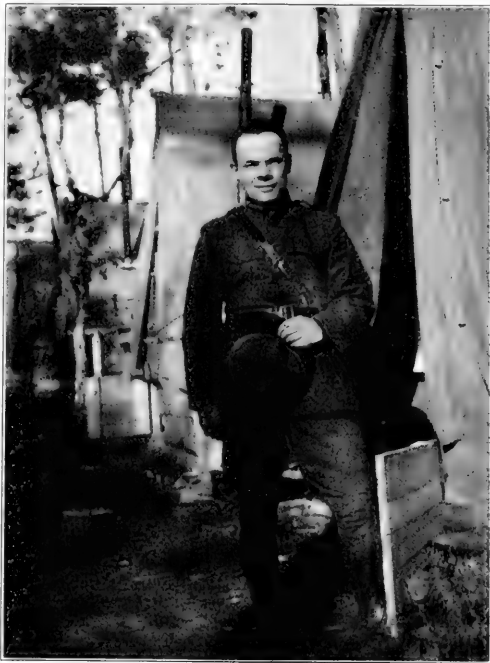
Gien. By the first of January the Americans had ten mills in operation; a month later, twenty-one; by March 1, thirty-four; and so on in increasing numbers until at the time of the signing of the armistice there were eighty-one mills buzzing away in various parts of France, with a dozen more in process of completion. If the war had continued, it would have been necessary for

the American foresters and lumbermen to have gone into some of the rougher mountain territory, where more difficult lumbering operations would have met them, including construction of railroads over steep grades and rocky passes. The engineers were preparing to meet these problems.

France was divided into districts to facilitate the handling of the forestry work, the number of districts being increased from time to time until there were eventually fourteen, one for each battalion, with headquarters at the following places: Dax, Major Brookings commanding; Epinal, Major S. O. Johnson; Dijon, Major Sanborn; Mimizan, Captain Phipps; Gien, Captain Lynch; Lapt, Major Kellogg; Chateauroux, Captain Maas; Bauge, Captain Vail; Bourg, Major Barnes; Bourges, Major Hinkley; Pontenx, Major

Lafon; Besancon, Major Kelley; Eclaron, Major Spencer, and Le Puy (the birthplace of Lafayette), Major Bartelme.

No finer body of men ever went from America than the foresters and lumbermen of the 20th Engineers. The highest tribute that can be paid to them is this: They did all that was expected of them—and more. The work which they did, the toil and the struggle in rain and mud, through long hours of the day and night, to get the timber out of the forests and through the mill; with no opportunity for decoration or military reward for service gallantly performed; fighting against obstacles which tried men's souls and made them "turn gray"—all this makes the members of America's great forest and lumber regiment worthy of a glowing page in the history of the world war for



CAPTAIN HOWARD Y. WILLIAMS

Chaplain of the 20th Engineers (Forestry) and doing yeoman work for God and country in France.



CAPT. H. R. CONDON

Headquarters, 11th Battalion, 20th Engineers



Photograph by Harris and Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FORESTRY)

1. 1st Lt. W. G. Conklin. 2. Capt. Frederick C. Moore. 3. 1st Lt. Frank Mizell. 4. 1st Lt. R. H. Rowdybush. 5. 2nd Lt. Luther B. McDaniel. 6. Capt. F. R. Weisel. 7. Capt. J. H. Price. 8. 1st Lt. Alfred D. Kettenbach. 9. 2nd Lt. Charles J. Davis. 10. Major George H. Kelly. 11. 1st Lt. Cornelius W. Smith, former Chaplain, 20th Regt. 12. Major William C. Moore.



CAPT. JOHN B. WOODS



FIRST LT. RISDEN T. ALLEN



FIRST LT. ROBERT L. DEERING

civilization. All but a few of the men who enlisted in the various forest battalions reached France. Among those who were destined never to arrive were 91 who went down on the ill-fated *Tuscania* when she was torpedoed off the Irish coast by a German submarine. Aboard this vessel was the 6th Battalion. Excellent discipline prevailed, however; prompt assistance came and most of the men were saved.

In describing this disaster, Thomas P. Reid, Yale Forest School, '13, wrote: "I had just finished supper and was back on deck, life belt on and all prepared, when the crash came. A tearing and a heavy thud, followed by a tremendous fall of water, left no doubt as to what had happened. An instant of silence, darkness and a great shouting as the fellows ran to their boat stations. Boats were lowered, some in good order, others in bad shape, and as one end fell faster than the other or went down with a crash, capsized and spilled all the men who were in it." After telling how eleven men got into a broken boat by jumping from the deck above, a good thirty feet, he adds:

"One of our fellows became chilled. We were all pretty wet, but not too cold to whistle, or chew tobacco, and even smoke cigarettes. We rubbed the chilled one, pounded, stood him on his feet, and 'cussed' him to make him 'hot,' and succeeded, for when a trawler finally picked us up about midnight, he was in pretty fair shape.

"Six hours later we were landed, 500 of us, somewhere in Ireland, where nothing was too good for us. Seemed like the whole town just spread themselves; tobacco, clothes, food, candy, money was almost forced upon us all. There were entertainments by the Naval Base Red Cross, and so forth. There will always be the warmest of spots in our hearts for the people there. Withal it was really wonderful how so many were taken from the ship in almost perfect order."

Major Wade, in command of the 6th Battalion, was the last soldier to leave the sinking *Tuscania*.

While none of the other members of the forest regiment were compelled to go through an experience as gruelling as that which befell those aboard the *Tuscania*, nevertheless there was excitement and adventure aplenty almost from the moment the various battalions entrained at American University Camp, ready for the long journey, right through to the end. There were new experiences to satisfy the most venturesome. The story of the trip across of the two battalions composing the 10th Regiment, the first to sail, may be taken as typical of similar experiences by those who followed. Here is the interesting account of that journey as related by Major David T. Mason, professor of forestry in the University of California, who helped to organize this first forest regiment and went with it to France. They sailed from New York on the Cunard liner, *Carthage*, leaving there September 10. Major Mason continues:

"There were the usual scenes at the port of embarkation; a ferry boat carried the regiment from the Pennsylvania terminal to the pier where the *Carthage* lay. For many of the men this was the first glimpse of New



SECOND LT. JOHN W. SELTZER



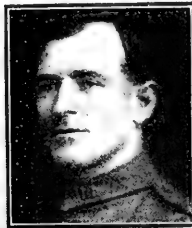
CAPTAIN DORR SKEELS



2nd LT. STANLEY H. HODGMAN



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Photograph by Harris and Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FORESTRY)

1. 1st Lt. William A. Foster. 2. 1st Lt. Clement C. Abbott. 3. 1st Lt. E. B. Hamilton. 4. Capt. Earle P. Dudley. 5. 1st Lt. Fayette L. Thompson.
6. 1st Lt. Leroy A. Schall. 7. 1st Lt. Robert B. Hill. 8. Capt. John Summerset. 9. 1st Lt. R. N. Benjamin.
10. 1st Lt. Charles P. Hatrick. 11. 1st Lt. Albert L. Shellworth.

York, and it was a brief one, for sentries at the head of the pier prevented any visiting ashore. Less than a half dozen friends of members of the regiment were on hand to wave "goodbye." The decks had been alive with men all day, but as the ship backed out into the stream, everyone was ordered out of sight, and she steamed down the harbor apparently an ordinary freighter. Farewells were waved to the Statue of Liberty outlined against the last glow of the sunset sky.

"A two-day run brought the Carpathia into the beautiful land-locked harbor of Halifax, where there was a nine-day wait for the assembling of the convoy. These were impatient days, for all wanted to be on the way. Although the men were not allowed shore leave, it was permitted to lower the ship's boats and to row around the inner harbor; the principal interest of these days was in the boat races organized between the companies of the 10th and with the boats from other ships. Finally the convoy was ready, and on September 21, thirteen merchant ships, some of them transporting American, Australian and Canadian troops, wound slowly through the narrows and down the outer harbor past ships of the British Navy. There was no hiding below this time; all were on deck to send back cheers in return for the fine music and cheers from the navy. At dusk the convoy passed in single file through the submarine net guarding the harbor. As night came on the regular convoy formation in three columns was taken. We found ourselves under the escort of a cruiser so fantastically camouflaged that she was promptly nicknamed the 'scrambled egg.'

"There was a certain grimness in the arrangements on the Carpathia which gave a not wholly unpleasant indication of the possibility of adventures ahead. Small boats were swung out over the side ready to be hastily launched. Piles of life rafts encumbered the decks. Life preservers were much in evidence, especially after the danger zone was reached. The ship followed a zigzag of courses, changed every few minutes. Everything was dark at night; even smoking on deck was prohibited. There were the frequent station drills, when at the warn-

ing from the siren, every one in his life preserver moved quietly but rapidly to his station for abandoning ship; at first it took twelve to fifteen minutes from the time the alarm was given for all to reach their stations, but later careful training reduced this time to about five minutes. There was a thrill one thick, stormy night when the alarm sounded; in the fog, the 'scrambled egg' had nearly rammed the Carpathia. A small storm which

lasted for two days sent a good many to their bunks; later in censoring letters, those of us who had the censoring to do were amazed to find some such remarks as this in almost every letter: 'It was a great storm; everybody was sick but me. Ha! ha!' The decks were filled nearly all day with the different companies up in turn for their physical drill. One afternoon everyone was delighted when the group of ten specks that climbed 'over the hill' to the southeast drew nearer and turned out to be our destroyer escort to take us through the 'danger zone.' The destroyers spread out in a ring around the convoy and darted back and forth in a very businesslike manner. We realized then that there had been a little tension and that it was good to have the destroyers for company.

"After two days in the danger zone the convoy divided. Part went into Liverpool; the Carpathia, with several other ships,

headed for Glasgow. In the early morning of October 2 the hills of Scotland were first sighted. The destroyers turned back as the mine fields at the mouth of the Firth of Clyde were entered. A little later the convoy passed through the gate in the submarine nets at Greenock, and there waited for the tide before going on up the river. The sail up the Clyde is a vivid memory. There were glimpses of "tank"-manufacturing plants, of famous German submarines captured and brought to port. The river, lined for miles on both sides with ship-building plants, is so narrow that the new ships have to be launched at an angle to prevent their striking the opposite bank. Steaming slowly up the river, we were heartily cheered by the thousands of shipworkers along the shores. They were near enough to see the expres-



MAJ DAVID T. MASON

sions on their faces; they were evidently delighted to see the first American troops to arrive in Scotland, and we were at least equally glad to see the Scotch. It was especially interesting to note the great number of buxom Scotch girls in smocks, breeches and puttees working on ship construction.

"After a few hours of well-ordered hustle in getting off the troops and baggage, the regiment entrained for a destination to us unknown. Fifteen hours on the train brought us to Southampton, England, where a few days were spent in a so-called "rest camp" awaiting transportation across the channel. No one seemed to know just why the word "rest" was used in connection with such a camp, for it was anything but restful. The line of march from the city out to this camp was along a splendid avenue beneath an arch of magnificent elms. The avenue, strange to say, had been constructed in other days by other soldiers waiting to take ship from Southampton—British soldiers waiting to embark for the Atlantic voyage in the days of the American Revolution. Few of us had ever been in Europe before, so that there was keen interest in investigating the old parts of the city—the remains of the old walls, the old inns like pages from Thackeray, the monument on the waterfront to commemorate the sailing of the Mayflower in 1620. A brief glance at beautiful England, and we crowded aboard a shallow draught side-wheel boat to be whisked across the English Channel to La Havre during the night."

While the various battalions and even some of the companies were broken up when they reached France and scattered in widely different parts of the country, from the rich maritime pine section of the southwest up through the central part and on to the Vosges and Argonne regions, their experiences in many respects were similar. Some of the incidents which befell the 10th Regiment along the way are picturesquely described by Major Mason, who says:

"France was reached on October 7, but there were still days of travel and waiting ahead before timber operations could begin. Fortunately, only a day was spent in the rest camp at La Havre, sheltered from the pelting rain in sheds paved with cobbles. Once more the regi-



CAPT. JOHN D. GUTHRIE

ment entrained with the destination unknown to us. The French troop train, now so well known to millions of Americans, was a curiosity to us. There were the usual "eighty-four" cars—little box cars plainly marked "eight horses lengthwise or forty men." It was hard to see how forty husky Americans, each carrying his full equipment, could crowd into one of the little cars, but it was done. There were rough benches in the cars, but no toilet facilities whatever. Thirty-six hours of slow running, which carried us around the outskirts of Paris and gave a glimpse of the palace at Versailles, finally brought us to Nevers, a small city in almost the exact center of France.

A tent camp was pitched in a well turfed field in the outskirts of Nevers. A few days of rain and the tramping of twelve

hundred odd pairs of feet soon stirred up a large mud pie bearing little resemblance to the original field. Here the regiment waited for two weeks for the arrival of motor and other equipment brought on the Carpathia. Looking back it now seems remarkable that so much of the equipment succeeded in crossing England, the Channel and half of France so quickly. In Nevers, we had our first experience in the French lumber business; about two thousand feet of lumber was needed for crating material, so a motor truck and a detail of men went out to find it; after the biggest local stock of lumber had been found, there was a long parley through an interpreter with the woman who managed the place; finally some green, rough white fir, grading about number two common, was found in three-fourths inch and one inch thicknesses; we paid at the rate of one hundred dollars per thousand feet board measure for the thinner stock and one hundred twenty dollars for the thicker.

"To meet the most pressing timber needs of the American Army, the regiment was split into five parts for work in different parts of France. Two and one-half companies were ordered to the pine forests along the coast in the southwest; two companies were to go into the fir forests of the Vosges Mountains in Eastern France; and a half company was to cut pine in Brittany near the coast in the northwest; and two other companies were to work in different parts of Central France.



HEADQUARTERS OF THE AMERICAN OPERATIONS IN THE VICINITY OF PONTENX, IN ONE OF THE GROUP OF SCHOOL BUILDINGS ON THE PONTENX VILLAGE GREEN, LANDES, FRANCE

As fast as equipment arrived it was divided between the different units; as soon as there was sufficient equipment on hand to permit work to begin, the units proceeded to their stations, which were reached just before November 1. Only a comparatively small part of the logging equipment and no complete sawmill units had accompanied the regiment on the Carpathia, so the first work was necessarily to be limited to that preparatory to sawmill operation and to that of producing timber in the round.

"The writer was assigned to the work of taking the motor train of the First Battalion across country from Nevers to Pontenx, a small village about sixty miles southwest of Bordeaux. The three days allowed gave just time enough to make the three hundred sixty mile run, for the heavy trucks could do only about twelve miles per hour, and lack of lights limited the running

time from six in the morning to five at night. It was a beautiful trip over finer roads than any of us had ever traveled before. The first two days of the trip led through a decidedly hilly country, with fine hardwood forests scattered about here and there. Most of the route followed the French national highways, which usually have a hard surface of water bound macadam about eighteen feet wide, on each side of which is smooth turf about ten feet wide for columns of marching men when need arises. The roads are almost everywhere lined by splendid trees which are made to swell the incomes of the communes which own them; chestnut, cherry and other



THESE LOADING CRANES WERE USED FOR TRANSFERRING THE LUMBER FROM NARROW GAUGE TO BROAD GAUGE CARS IN MANY OF THE SHIPPING YARDS OF THE 20th REGIMENT



20th REGIMENT TROOPS AT THE BELLEVUE CAMP IN FRANCE USED KITCHEN REFUSE TO FEED HOGS, RAISED THE HOGS AND AUGMENTED THEIR COMPANY FUNDS BY SELLING THEM

fruit trees yield their annual crops, and finally their timber; in Southern France, cork oak trees furnish crops of bark every eight or ten years; Lombardy poplars, locust, sycamores and others are valuable mainly for their timber; all add greatly to the beauty of the highways. Along much of the route the French had seen no Americans before, and our welcome was the more hearty for that reason. The motor train reached Pontenx just before the arrival of the train loaded with troops, supplies and equipment."

A picture of the men in their camps, of the way in which preparations were made for their living and for the lumber operations which they were anxious to start as promptly as possible, is given by Major Mason, who says:

"The first day in the 'Landes,' as the pine forested region of Southwestern France is known, was an especially busy one. The railway cars had to be unloaded and released immediately and camp established in the pine forest four miles away. Fortunately, a bright,



A LOAD OF PILING APPROXIMATELY 70 FEET LONG ON MOTOR TRUCK AND TRAILER GOING AROUND SHARP TURN IN THE ROAD IN A FRENCH SPRUCE FOREST. OPERATIONS OF 20th ENGINEERS

sunny day among a long series of rainy ones made it possible to get under cover without wetting men and supplies. The underbrush was cleared from the camp site, and trees felled to make room for the pyramidal tents. Kitchens were soon ready to serve hot meals to the long lines of hungry men. Bed sacks were filled with straw and for the first few nights were placed direct on the wet sand; water oozed up through that sand for days. As soon as possible lumber was obtained from nearby French mills to be used in flooring the tents and in building bunks. Sibley stoves installed in the tents improved conditions and men no longer had to go to bed right after supper to keep warm. Although there was plenty of wood handy on the camp site, it was all sappy and wet, and dried out very slowly during the winter. For fully two months it was necessary to buy dry wood for the kitchens. At this time dry pine wood was selling in Bordeaux at twenty-two dollars per cord; it was less expensive, of course, in the forest near Pontenx. Wells were dug through two or more layers of hard pan to get away from the surface water, and even the water so obtained was chlorinated before it was put in the lister bags, or 'Carrie Nation cows' as they were familiarly known, for the men to drink. Kitchen refuse was partly

burned in incinerators and partly fed to hogs. The hogs turned out to be an important source of profit to the company funds; young pigs weighing twenty to twenty-five pounds were bought from the natives for about twenty dollars per head, and after a few months' feeding until they had reached a weight of about two hundred pounds they were sold in the French markets at about seventy dollars per head.

"This camp at which American forestry operations began in the Landes was in a section of the country quite typical of the two and three-tenths million acres of pine forest which border the Atlantic and at places extend sixty miles or more inland in Southwestern France. Originally a worthless, sandy, marshy waste, it has been reclaimed by drainage and the planting of forests of maritime pine until now it is one of the richest portions of France. The region is now about eighty per cent forested with even-aged stands of trees of different ages up to sixty years in the different stands. The unforested area consists of small lakes and highly cultivated little farms scattered through the forest; the farmers work both on their farms and in the adjoining forests, thus furnishing a stable supply of labor for the forest work.

"Timber operations were started immediately by small crews, while other crews continued the work of settling camp. The first work was that of getting out piling, greatly needed for the construction of American docks

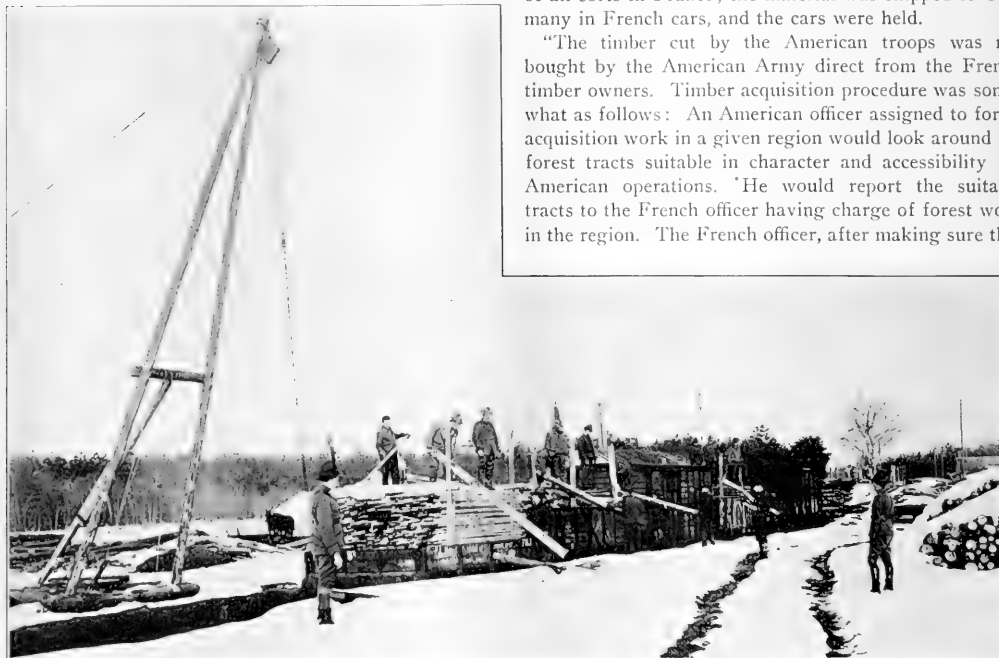


THE LUMBERJACKS AND FORESTERS HELPED TO BUILD TELEPHONIC SYSTEM PLATFORMS IN FRANCE WHICH WERE LIKE FIRE LOOKOUT STATIONS IN OUR OWN FORESTS.

at the port of Bassens, near Bordeaux. There were sufficient tools to fell the trees, but only makeshift logging equipment to get the piling to the edge of the hard road. No horses had yet arrived. It was quite amusing to see a forty-foot piling, suspended beneath the axle connecting a pair of dump cart wheels, dragged through the woods by ten men on a rope ahead while ten more men with cant hooks helped along the sides. A drenching

it was a beginning. The production of fuel wood from limbs and tops and of barbed wire stakes from small trees was under way. At this stage of the operations, especially, it was difficult to secure railway cars in which to make shipments. Throughout the war, France was struggling with a car shortage partly caused by pre-war planning by the Germans, as immediately before August, 1914, Germans bought great quantities of raw materials of all sorts in France; the material was shipped to Germany in French cars, and the cars were held.

"The timber cut by the American troops was not bought by the American Army direct from the French timber owners. Timber acquisition procedure was somewhat as follows: An American officer assigned to forest acquisition work in a given region would look around for forest tracts suitable in character and accessibility for American operations. He would report the suitable tracts to the French officer having charge of forest work in the region. The French officer, after making sure that



THE SPEED WITH WHICH THE 20th ENGINEERS LOADED LUMBER TRAINS AMAZED THE FRENCH, AS DID MOST OF THE OPERATIONS OF THE REGIMENT

rain was falling, but the men paid little attention, for at last they were getting out timber. To move the piling to the railroad escort wagon, running gears were rigged up to carry the small ends while the butt ends were carried on F. W. D. motor trucks; three pieces were taken in each load. It was almost impossible to run the trucks slowly enough to be safe for the escort wagons, so when the horses arrived a few days later, a four-horse team and another escort wagon were substituted for the truck.

"Foundations were constructed so that the sawmills might be set up as quickly as possible when they arrived from America. Large quantities of logs were cut and decked ready for the mills. Telephone lines were built. Work was started on the installation of railway switches and spurs. This preliminary work was all very necessary, but the men were impatient to smell new pine boards and sawdust. So to get some lumber production started, even though small in amount, the night shift of a French sawmill was leased; this mill could produce only about three thousand feet of lumber each night, but

there was no sufficient reason why the Americans should not have the timber in question, would estimate the amount, appraise the value and mark the timber for cutting. If the owner was satisfied to sell the timber at a reasonable price, his figure would be accepted, but if the owner asked an exorbitant price, the French officer would fix a reasonable price at which the timber would be requisitioned. The French government purchased the timber and resold it to the American Army at cost. Rights of way were obtained in much the same fashion. This system undoubtedly protected the United States from the serious overcharges which would have been possible through our lack of knowledge of French timber values. The value of timber was astonishing to Americans, used to prices of from two to eight dollars per thousand feet on the stump for pine timber in most parts of America; it was found that the pine timber of the Landes was costing from twenty to forty dollars per thousand feet, depending upon quality and location; hardwood of similar quality in central France was even

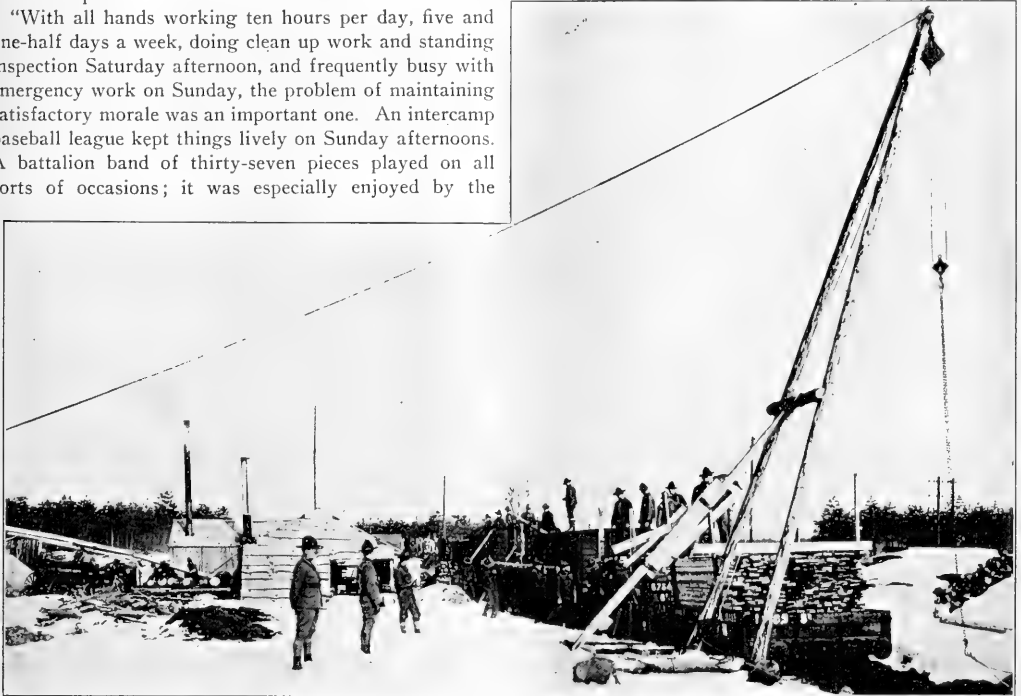
more costly. With these values in view, it is easier to understand the very close utilization of all classes of material in the French forests.

"The question of amusement and of keeping the men in first-class physical condition, properly disciplined and in good spirits, was an important one and was well looked after. The Y. M. C. A. and the chaplains who were assigned to the regiment performed worthy service in this respect.

"With all hands working ten hours per day, five and one-half days a week, doing clean up work and standing inspection Saturday afternoon, and frequently busy with emergency work on Sunday, the problem of maintaining satisfactory morale was an important one. An intercamp baseball league kept things lively on Sunday afternoons. A battalion band of thirty-seven pieces played on all sorts of occasions; it was especially enjoyed by the

tuted; this resulted in a marked improvement in morale. In the spring, especially with the news of the successful German drives, many of the men became restless and there were many applications for transfer to combatant organizations; if these applications had been acted upon favorably, few would have been left to run the sawmills.

"The men were cordially received by nearly all of the French people. Most of the Americans made at least

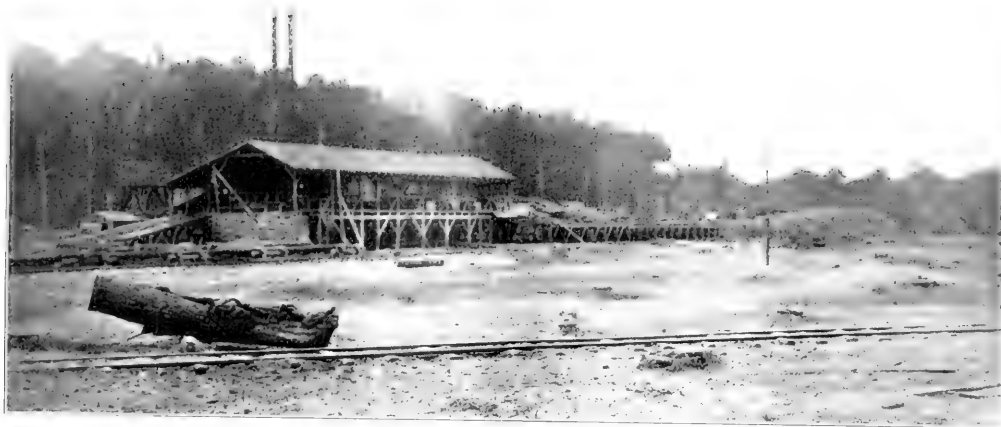


LARGE CREW OF AMERICAN ENGINEERS MAKING QUICK WORK OF LOADING LUMBER AND TIES ON FRENCH RAILWAY CARS

French civilians, who had been without music since the beginning of the war. The Y. M. C. A. installed a hut in each camp where such features as reading matter, writing materials, phonographs, billiard tables, pianos, moving pictures, et cetera, were much enjoyed; one of the most appreciated features was the 'Y. M. C. A. lady.' When the fine weather came, men were sent by motor truck each week from some camps to nearby places for a two-day week end holiday. On Sundays some men toured the nearby country on bicycles, and from Pontenx for instance men hiked over the dunes to the ocean for a few hours on the beach. The seashore was especially popular after a torpedoed Portuguese ship was beached, for it had in its cargo three thousand barrels of wine—'pas de vin ordinaire, mais de l'ambrosie.' Military drill had been abandoned during the short days and pressing work of the winter; there was evident a falling off in spirit and discipline; in the spring, short periods of drill on Saturday afternoon and Sunday morning were insti-

a few goods friends among the French. Their efforts to learn the language were earnest and, no doubt, often amusing to the French. The medical officers with the forestry and lumber troops did a great deal for the French civilians. The abbe of the church at Pontenx arranged a special Easter service in English for our men. There were many such exchanges of courtesy, which made for hearty friendship between the French and Americans.

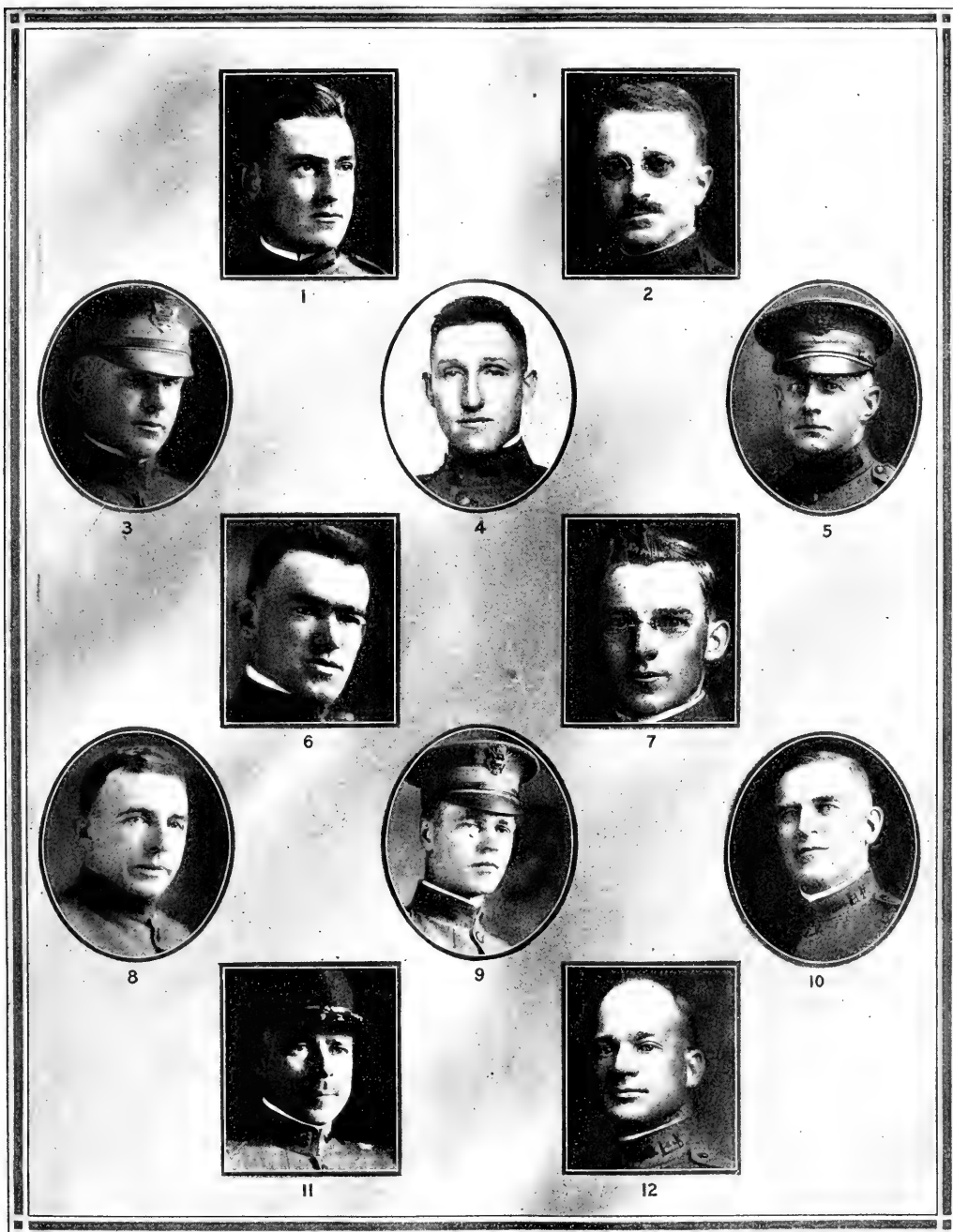
"Unfortunately, the attitude of a few of the peasants in the pine forest districts was not so friendly at first. They said among themselves, 'Look at those strapping big American soldiers. Why do they come here? They are bigger and stronger than our men ever were. While our men, who have been away for over three years, and are still at the front fighting, these Americans come to hide in the forest and to do the work our men should be here doing; they cut the trees that we want to save for our turpentine industry. Why don't they go to the



VIEW OF THE MILL YARD OF THE BOURICOS 20-M AMERICAN MILL NEAR PONTENX, LANDES. A LOG TRAIN HAS JUST BROUGHT THE LOGS OVER THE NARROW GAUGE RAILWAY SYSTEM FROM THE FOREST TO THE POINT WHERE THE LOGS WILL BE UNLOADED ON TO THE SKIDS IN THE FOREGROUND, OVER WHICH THE LOGS WILL BE ROLLED TO THE CARTS AT THE LEFT, UPON WHICH THEY WILL BE PULLED UP THE INCLINE INTO THE SAWMILL. THE GREAT HEAP OF SLABS AND EDGINGS AT THE RIGHT OF THE LOG TRAIN ARE DESTINED TO BE MADE INTO CHARCOAL FOR USE IN A NEARBY MUNITIONS PLANT.



A 20-M AMERICAN SAWMILL IN THE SAND DUNES NEAR THE ATLANTIC COAST OF FRANCE. MARITIME PINE FOREST IN THE BACKGROUND.



Photographs by Harris & Ewing

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH REGIMENT (FORESTRY)

1. Capt. Harold T. Antrim. 2. 1st Lt. Alexander H. Ellison. 3. 1st Lt. Charles M. Jenkins. 4. 1st Lt. Henry E. Power. 5. Capt. Edwin I. Wemple. 6. 1st Lt. Morton Van Meter. 7. 1st Lt. Marion Nine. 8. Capt. Oliver J. Todd. 9. 1st Lt. Earl B. Birmingham. 10. Capt. W. D. Starbird. 11. Capt. Andrew J. Fisk. 12. 1st Lt. Herbert L. Holderman.

front and fight and let our men come home?' The men even heard the opinion was current among some of the peasants that, if the Allies won the war England would take Northern France and the United States would seize Southern France. Evidently German propaganda was at work. However, the ignorant peasant was not to be blamed too much for his feeling, for he could not see clearly why it was essential that American engineers precede the main American Army in France to get out timber and to use the timber in building docks, warehouses, railroads, hospitals, barracks, et cetera, for the fighting forces coming later on. The intelligent French arranged a series of discussions and took other steps which stilled the complaints of the peasants until the fighting troops appeared at the front in force in the late spring of 1918, when the attitude of all of the French became extremely cordial, where before in some quarters it had been merely polite.

"The impression which the forestry and lumber troops made on the French is perhaps best indicated in a series of compositions written by the school children of a small town. The children were asked by their teacher to write their observations on the Americans; the children had no idea that Americans would ever see what they wrote. [The compositions, published in 'The Independent,' indicate that the children found the Americans cleanly about their persons, polite, good natured, generous, quite free in spending their money and in some cases strongly

inclined to the use of liquor. (It may be said here that, although the American lumberjack in his native habitat is well known as a user of strong drink, there was a remarkably little trouble from this source in France.)] One of the compositions, written by Renee Dourthe, daughter of the schoolmaster, is quoted herewith: 'The work of the Americans is certainly a curious one. I saw them raise huge logs with large pliers, as easily as they would have moved a straw. Their furnaces for their kitchens are half in the ground, in order not to waste any heat. What struck me especially about the American soldiers is their cleanliness. All of them are tall, healthy and strong, owing to their hygiene. Their teeth are very white; and not to soil their hands, they put on gloves, even at work.

"Another thing I admired also is their politeness. France had the fame of being the most polite nation in the world. We have often heard and read about the French courtesy. Is France going to lose her rank among the well-bred nations?

"I like the American soldiers who came to help France. I like the Americans who came here to defend justice and right. I admire the Americans who remembered France, and who came to her in spite of the many dangers. Long live the United States of America!"

[Owing to the fact that the rosters of several companies failed to arrive from France as this issue goes to press, it is impossible to be certain that the titles of some of the officers mentioned in the article are correct.—EDITOR.]

**WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE
THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.**



LONG MARTINI PILING LOADED ON AMERICAN NARROW GAUGE CARS READY FOR TRANSPORTATION FROM THE FOREST TO THE MAIN LINE RAILWAY SHIPPING POINT NEAR PONTENX, LANDES, FRANCE.

A LESSON FROM FRANCE

By CAPT. RALPH H. FAULKNER, 20th ENGINEERS

AT THIS day when the subject of reforestation is receiving some attention but getting only a very small part of the support, both public and governmental, that it should, we have returning to us 20,000 men who have spent from six to eighteen months in France. These men, whether consciously or not, have had borne in upon them the vast importance of a definite and vigorously applied forest policy.

When the 10th and 20th Engineers left this country it is doubtful whether many of them had any idea of the forest wealth of France. I know it was the opinion of the writer that the duty of the regiments would be to cut the timber from public parks and roadways. In fact, I really visualized the entrance of American lumber-jacks into the very backyards of the French inhabitants for the purpose of securing timber. My experience was limited mostly to the southwestern part of France, and as our train passed southward from Bordeaux I felt that whoever had given me the idea that France was denuded of timber had most evidently not referred to that part of the country.

More than one hundred years ago that territory on the Bay of Biscay bounded by the Rivers Gironde at Bordeaux and the Adour at Biarritz, was one vast desert

of sand, unceasingly driven inland by the western winds and mounting into dune after dune. This moving mass of sands, which had gone on for more than a century, submerged the crops and villages. The sand dunes thus irresistibly mounted up at a rate said to be about forty meters per year on a length of over 300 kilometers, and an average breadth of six or seven kilometers. More than 250,000 fertile acres were already covered with sand by 1790, and the inhabitants, quite powerless, witnessed the frightful progress of this devastating plague.

The first people to conceive the idea of combating the advance of the sands were two brothers, Desbiey, who lived at St. Julien-en-born in the Department of Landes. These two men, upon their private initiatives, set about opposing obstacles in the way of wattle-work and the planting of Gorse and Scotch-broom. At this time no one had conceived the idea of planting maritime pine, so that these two brothers stood out as pioneers in a fundamental plan of forestry. All of their efforts, however, proved unavailing for the sands mounted more rapidly than the growth of the Gorse.

About this time public opinion brought such pressure to bear upon the government of Louis XVI that an engineer was appointed to find some means of stopping



SCENE IN A MARITIME PINE FOREST, SOUTHWESTERN FRANCE. BROAD GAUGE SPUR PARALLELED BY LOADING DOCKS ON WHICH ARE NARROW GAUGE TRACKS TO TRANSPORT TIES AND OTHER PRODUCTS FROM THE MILL TO THE FRENCH RAILWAY CARS IN THE CENTER



AMERICAN OPERATIONS IN PROGRESS IN A FRENCH HARDWOOD FOREST. IN THE CENTER A LOAD OF LOGS ON A CAR ON THE WAY UP THE INCLINE INTO THE MILL.

the progress of the dunes. In 1779 Baron de Charlevoix-Villers, a Naval officer, was ordered to study the creation of a naval port at Arcachon. He submitted several papers showing that moving sands could be fixed by vegetation, really adopting the process used at that time at Dunkirk. However, he was unable to put his plans into execution, through transfer to other duties, and for five years the crying need for permanent fixation of the dunes in the Landes and Gironde was permitted to drag on.

In 1784 Nicolas Bremon-tier, an engineer, born near Rouen, was appointed chief surveyor at Bordeaux. To this man is due probably the existence of the present maritime pine forests in France for he put into execution the researches of Despiey and Charlevoix-Villers. He secured permission from the government to give two years of study to the problem of the sand dunes, and before this time was up, by the pure lights of his views and the persuasive strength of his faith he at last interested the government in the great work of creating forest land out of a vast desert.

At the beginning of 1787 a sum of 50,000 livres was placed at his disposal for the commencement of the work of forestation in his district. It was not until the middle of that year that the first experiments of Bremon-

tier were made. Having profited by the failure of Despiey in the mere planting of gorse he conceived the idea of planting maritime pine and he followed this course successfully until 1793, at which time his government failing to provide funds, he was forced to discontinue his efforts. However, this valiant Frenchman, who had ever the courage of his convictions, was not daunted and applied to the learned societies of France for assistance, having proven to himself and to the inhabitants of this country that the fixation of the dunes was a possibility. He fought with persistent effort and with an admirable earnestness for both the attention and the resources of his government. It was not an easy thing at this time, if one will refer to French history, to convince a government that a plan of forestation deserved important consideration, for it was about this time that France was in the throes of her revolution.

Bremon-tier saw the changing of a mighty tract of land from a desert of sand, whose yearly encroachment inland was threatening and wiping out entire villages, to a huge forest which would give competence to the populace which it had steadily driven back, and for his unwearied persistence he is entitled to the gratitude of posterity.

It was not until July 2, 1801, that Bremontier was successful in creating a committee, appointed by the Minister for the Home Department (I should judge this to be the same as our Department of the Interior), with instructions to "continue to fix, plant and care for the growth of trees on the sand dunes on the Bay of Biscay." Bremontier, very properly, was made President of this Committee and the work was resumed in the Department of Lands, in 1803 at Lit and Mimizan (where the fourth battalion of the 20th Engineers was located). After this the planting of trees went on uninterruptedly and with increasing activity until 1865 when the primary project was announced by the French Government as completed. The total cost over this entire time was less than 14,000,000 francs (\$2,800,000) and now today, with a very perfect forest plan carried out, those sand dunes which in 1790 threatened all of Southwestern France, have been transformed into an immense forest and exhaustless source of income for the inhabitants. The vast majority of the inhabitants of the Gironde and the Landes, most especially the Landes, find employment with good remuneration in the exploitation of the present-day forest.

It was an admirable victory of human intelligence over brutal nature and indisputably this one man, Bremontier, who died in Paris in 1809, deserves the gratitude of not

only the people of France, but of all those interested in forestry throughout the world.

From this district there is shipped to Great Britain alone over 800,000 tons of pit props per year to say nothing of the shipment of resin and turpentine, and until 1914 an average of approximately 600 shiploads per year of forest products left the ports of Bordeaux and Arcachon. Germany, Switzerland, Italy, Holland and Russia, were all purchasers of this product, which was made possible by the indomitable will of this real hero of France to whom two monuments have been built in the heart of the land which he veritably made.

We have, in America, a district on our South Atlantic seaboard quite similar in soil property to that of the Department of Landes in France, and while we rest on our oars, with a firm conviction that our timber supply is inexhaustible, we must be brought to the realization that this supply is ever moving westward. There are those who scoff at a policy of reforestation, but the work of the man and the eminent success of the man who is the subject of this article, stands out forever as a refutation of any argument against a sane forest policy. Whether or not we have in the United States a Bremontier I do not know, but if we have, it is high time that he come forth and perpetuate our forest East of the Rockies.



WINTER SCENE AT ONE OF THE SAWMILLS IN FRANCE

WAR SERVICE OF THE AMERICAN FORESTRY ASSOCIATION

THE American Forestry Association determined when the United States entered the war to do all it possibly could to aid in the nationwide movement for victory and, as it felt particularly interested in the organization of the forestry and lumberjack regiment, it is perhaps not inappropriate to mention to the men for whom this issue of the AMERICAN FORESTRY magazine is made a souvenir edition, some of its activities.

It aided, through its Conservation Department, the National War Garden Commission organized in March, 1917, and conducted until June 1, 1919. This commission, conceived, directed and financed by Charles Lathrop Pack, president of the American Forestry Association, inspired the planting of war gardens on vacant lots and slacker land throughout the United States. It furnished instruction to individuals, it organized communities, it distributed literature, it—in a word—did everything worth doing to help raise food where none was raised before in order to help, as General Pershing expressed it, "to keep the food coming." Its work resulted in food of a value of over a billion dollars being raised by the war gardeners. It furnished equipment for a war garden at Camp Dix, New Jersey, and this garden inspired the planting of gardens at other camps of soldiers. Its plan of work was closely studied by the French, British and Canadian governments and some of its methods were successfully adopted by these governments. Its work was conducted from the offices of the American Forestry Association, in Washington.

The Association started a fund for the welfare and comfort of the forestry and lumberjack soldiers, as told in detail on another page.

In December, 1919, members of the Association raised a special fund and sent Secretary Percival S. Ridsdale to France, Belgium and Great Britain to study the forest losses of these countries. The result of the trip was an offer by the Association to provide American forest tree seed to help in reforesting the war-stricken forests of these countries. This offer was gratefully accepted, and an effort is now being made to secure the seed needed, partly by donations from states and partly by a fund which is now being raised.

The Association's magazine, AMERICAN FORESTRY, devoted a great deal of its space to articles and photographs about the effect of the war upon the forests of the United States, Canada, France, Belgium and Great Britain, and many more such articles are now in hand ready for publication.

Copies of AMERICAN FORESTRY Magazine were sent to the 20th Regiment in France and to the camps in the United States each month.

The Association is now aiding the Welfare Fund Committee to secure positions for lumbermen and foresters in War Service.

It has since the fall of 1918 earnestly urged the planting of Memorial Trees in tribute to those who gave their lives for their country or offered their lives in the Great War. Thousands of Memorial Trees have been planted and many thousands more will be planted next fall. The movement is spreading rapidly, and in addition to its fitness from the standpoint of memorial tributes it is also most serviceable in the cause of forestry by interesting thousands of people in trees.

"THE GREAT TREE MAKER"

From every section of the United States the American Forestry Association is getting reports of Memorial Tree planting and is registering these trees on its national honor roll. Georgetown University has dedicated fifty-four memorial trees at its 120th Commencement and marked them with the bronze marker designed by the Association. At San Francisco a Hero Grove was dedicated on Memorial Day and Cleveland on the same day dedicated an avenue of Liberty Oaks. Twenty schools in Cincinnati have planted Memorial Trees. The Daughters of the Confederacy are planting Memorial Trees, the Cordele, Georgia, Chapter being the first to register with the Association. The Daughters of the American Revolution are planting, too, the "Our Flag" Chapter, of Washington, D. C., being the first to report to the Association.

Rev. Francis E. Clark has sent a call to the Christian Endeavor Societies of the world to plant Memorial Trees. "Thus

come closer to the Great Tree Maker," says Dr. Clark in his call, which will have far reaching effect. The American Forestry Association will gladly send free instructions to any person or organization planting trees, and it has prepared a planting day program which is being widely used. These are but examples of how wide spread the call of the Association to plant Memorial Trees has become.

Next fall more extensive planting is being planned. In the next issue American Forestry will begin printing the honor roll of those for whom trees have been planted. Every member of the Association can help in this great work by taking the lead in tree planting in his community. Start plans for fall planting in your town now. Work for a Memorial Avenue of trees or for Memorial Trees as the setting for any form of memorial your town may be adopting. Inform the Association of progress made.

JOBS FOR RETURNING LUMBERMEN AND FORESTERS

THE Welfare Fund for Lumbermen and Foresters in War Service has undertaken the task of aiding lumbermen and foresters released from war service to secure positions. The lumber organizations, the lumber trade papers, lumber companies and the American Forestry Association are aiding in this work.

Applications on sheets similar to the one on the next page are now being received by the American Forestry Association and forwarded by the Welfare Fund Committee to lumber organizations and lumbermen throughout the United States who will communicate directly with the men desiring the jobs.

Any men who wish aid in getting jobs and have not yet filed applications may do so now on the application blank printed on the next page.

Lieut.-Col. W. B. Greeley, of the 20th, in writing from France under date of April 26, 1919, to Percival S. Ridsdale, treasurer of the Welfare Fund, says:

"The officers of the 20th Engineers have been considering the question of assisting our returning soldiers to obtain employment in the United States. The policy of the American Expeditionary Forces to evacuate the troops in France rapidly during May and June has made it necessary to act promptly in this matter; and we have accordingly put the following plan into effect. Each company commander of the 20th Engineers and attached Service Troops will be sent a supply of printed forms. The company commanders have been requested to have such forms filled out by any men in their command who desire assistance, to append their own estimate of the soldiers' qualifications and character, and to mail the applications direct to the American Forestry Association, Washington, D. C. The time limits have made it necessary to put this scheme into effect without waiting for prior consultation with yourself or with the lumber organizations who are interested; but I feel that any plan to aid returning soldiers in this manner must begin with specific data on individual cases.

"All of the units of technical white troops, including the road battalions, which have been employed on forestry work in France and have not previously returned to the United States are to be released during the month of May; and may be expected to arrive in the United States roughly between May 20 and July 1. These units comprise approximately 9,700 men. Eight hundred negro Engineer Service Troops which have been employed upon forestry operations will also probably arrive in the United States between May 20 and July 1. The remaining negro Engineer Service Troops in France, aggregating about 5,600 men, will probably arrive in the United States

between June 20 and August 1. Several of the battalion commanders estimate that approximately 50 per cent of their men will desire assistance in obtaining employment.

"I fully appreciate that the plan which I have taken the liberty to initiate and the suggestion contained in this letter represent a large volume of work for the friends of the forestry troops in the United States. It is my strong conviction, however, that no greater service can be rendered to these men in recognition of the sacrifices which many of them have made in coming to France than to assist them in finding suitable employment under some such scheme as that indicated. I also feel that the large sums subscribed for welfare work for the forestry troops could not be expended to any better advantage. Furthermore, the forest industries at home have an interest of their own in getting in touch with a large proportion of these men. Our troops have been employed continuously upon industrial operations in France, under conditions which have tended to develop their technical skill and their resourcefulness to a high degree. Many of them have developed mechanical ability as mill sawyers, saw filers, motor truck drivers and mechanics, engineers and loggers which they did not have when they entered the army. Others have become capable teamsters, capable men on logging railroads, and the like. Many of them have profited greatly by the discipline and sense of organization developed in military service. These men represent, in the aggregate, an enormous economic asset to the United States and especially to the forest industries. It will be, in my judgment, of the utmost mutual advantage to men securing employment and to employers to do everything possible to get these returning soldiers placed so that their individual abilities can be put to the most productive use.

"I have also requested the company commanders to send to you direct statements concerning such cases as they may have where they feel that financial assistance should be extended to returning forestry soldiers on account of family distress, physical disability, or other good reasons, with their own recommendations as to what should be done. I do not anticipate that there will be many cases of this character. The majority of our men are in better condition physically than when they entered the army; and they have been spared the disabilities incurred by combat units. There will undoubtedly be many cases of physical disability among lumbermen who enlisted in combat units, but I know of no way to get in touch with these cases except through the receiving hospitals of the army in the United States."

EMPLOYMENT SHEET

FOR SOLDIERS WHO WISH LUMBERING OR FORESTRY JOBS

Name: Rank: Unit:

Married or Single: Age:

Address in France:

Address in United States:

Kind of work desired:

Section of U. S. preferred:

Past experience and qualifications:

Name and address of last employer:

Other references:

Recommendation of Company C. O.:

NOTE: THIS SHEET SHOULD BE SENT TO THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C., THE HEADQUARTERS OF THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE. THE APPLICANTS WILL BE INFORMED OF OPPORTUNITIES FOR EMPLOYMENT OR OF THE NAMES OF MEN IN THEIR HOME REGION WHO WILL BE PREPARED TO ASSIST THEM IN GETTING WORK.



A battery of Moore Moist Air Dry Kilns at Snoqualmie Falls Lumber Company's mill, near Seattle, Washington, on the Pacific Coast. This is the latest of the Weyerhaeuser group of mills, and is said to be the most modern lumber manufacturing plant in the world.

FROM THE ATLANTIC TO THE PACIFIC

you will find many of the

Largest and Most Progressive Lumber Mills

are using

MOORE'S MOIST AIR DRY KILN

for drying their product.

HERE ARE A FEW OF OUR MANY CUSTOMERS:

Central Coal & Coke Co., Kansas City, Mo.
Weyerhaeuser Timber Co., Everett, Wash.
Eastman, Gardiner & Co., Laurel, Miss.
National Steel Car Co., Hamilton, Ont., Can.
Westside Lumber Co., Tuolumne, Calif.
Freeman, Smith Lbr. Co., Millville, Ark.
Savannah River Lumber Co., Savannah, Ga.
Bagdad Land & Lumber Co., Bagdad, Fla., and Chicago, Ill.
Lucher & Moore Lumber Co., Orange, Texas.
Roland Lumber Co., Norfolk, Va.
F. E. Jackson Lumber Co., Riderwood, Ala., and Baltimore, Md.
Ragley Lumber Co., Ragley, La.
Buchner Lumber Co., Portland, Oregon.

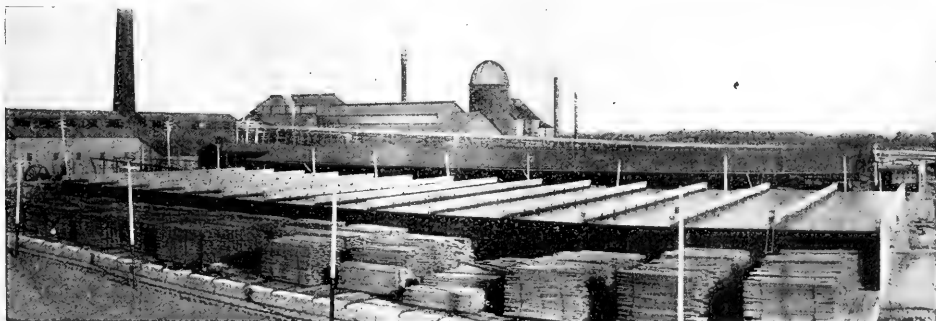
Kirby Lumber Co., Houston, Texas.
Trexler Lumber Co., Allentown, Pa., and Allen, S. C.
Pickering Lumber Co., Kansas City, Mo.
Goodear Lumber Co., Picayune, Miss.
Burton-Swartz Cypress Co., Perry, Fla.
Fosburgh Lumber Co., Norfolk, Va.
S. H. Bollinger & Co., Shreveport, La.
Vredenburgh Sawmill Co., Vredenburgh, Ala.
Standard Lumber Co., Live Oak, Fla.
North Portland Box Co. (Swift & Co.), Portland, Ore.
W. P. Brown & Sons Lumber Co., Louisville, Ky.
Dunlevie Lumber Co., Allenhurst, Ga.
Long-Bell Lumber Co., Kansas City, Mo.

We build kilns to suit the exacting requirements of each individual mill. We began building kilns in 1879. Forty years of continuous and successful kiln building enables us to render you real service. Why experiment? Write for catalog explaining our system.

MOORE DRY KILN CO.,

Box 1177,

Jacksonville, Fla.

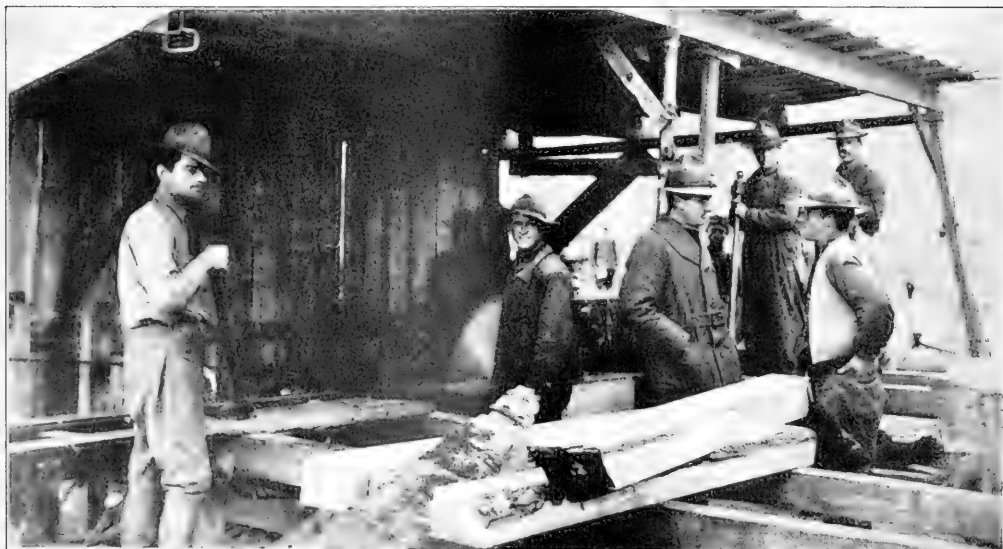


Showing 14 Moore Moist Air Kilns (they are operating a total of 34 Moore Kilns) at plant of Atlantic Coast Lumber Corp., Georgetown, S. C., on the Atlantic Coast. This is the largest board mill in the world, having a daily capacity of three-quarters of a million feet in boards.

THEY CALLED IT AMEX TIE MILL WE CALL IT AMERICAN EMPIRE BOLTER

95

OF THEM HELPED THE BOYS OF THE FORESTRY
DIVISION MAKE HISTORY IN FRANCE



24476 The Amex tie Mill, 20th Engrs.
France.

Lieut. Glenn H. Holloway, of the 20th Engineers, writing in the December 21st issue of The Southern Lumberman, says:

"The American Saw Mill Machinery Company furnished the bolter or tie mill, which is answering its purpose admirably. We only have to face these ties on two sides, so if you get the right sized poles and don't stop to cut any side plank it is possible to cut 30,000 feet in ten hours, once in a while, but the average is nearer 15,000 feet for a ten-hour shift."

SAW MILL MACHINERY OF EVERY DESCRIPTION

CATALOG ON REQUEST

OUR WAR BOOK, A Souvenir Record of the Work of 1200 American Machines, Free on Request

American Saw Mill Machinery Company

1398 HUDSON TERMINAL BLDG.

- - - - -

NEW YORK

THE WELFARE FUND

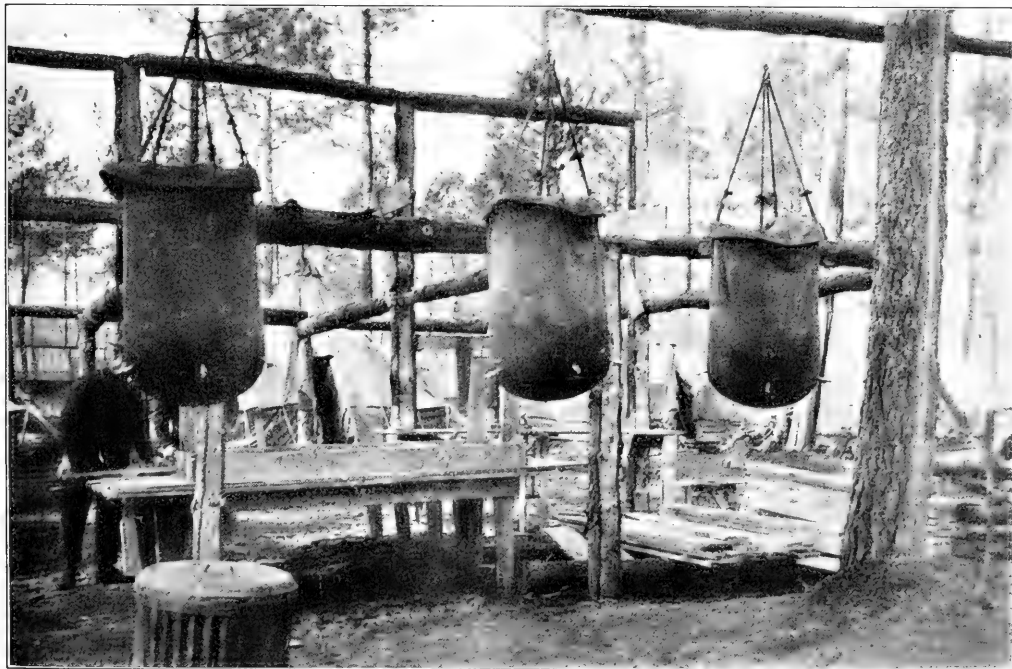
WHEN the forestry and lumberjack regiment was organized the American Forestry Association started the collection of a Welfare Fund for the purpose of supplying the men with comforts needed and with means for recreation to aid in keeping up their morale. This fund was later developed into the Welfare Fund for Lumbermen and Foresters in War Service, with the following officers: Honorary chairman, R. H. Downman, Council of National Defense, Washington, D. C.; acting chairman, W. R. Brown, Berlin, N. H.; secretary, E. A. Sterling, New York City; treasurer, Percival S. Ridsdale, secretary American Forestry Association, Washington, D. C. The members of the committee are: R. H. Downman, W. R. Brown, E. T. Allen, E. A. Diebold, M. E. Preisch, for the Lumber Industry; W. A. Priddie, E. D. Tennant, for the Order of Hoo-Hoo; A. F. Potter, W. L. Hall, for the U. S. Forest Service; Charles Lathrop Pack, for the American Forestry Association; James Boyd, John W. Long, for the Lumber Trade Press.

The Welfare Fund was devoted to purchasing wool to be knitted into sweaters, scarfs, socks, helmets, etc., to furnishing phonographs, athletic supplies and various articles needed by the men, and in providing funds for the use of the men when their pay failed to arrive. It was also

used in caring for sick and needy persons in the families of soldiers and after they had been ordered home it was used in the endeavor to secure work for those who desired jobs. It is still being used for this particular purpose. The method of finding jobs for jobless men is described on pages 1159 and 1160.

Senior Chaplain Howard Y. Williams of the 20th Regiment, in writing on February 25 from France about the use of the fund, said:

"The welfare fund raised for the men of the 20th Engineers is unique in the A. E. F. No other organization that I know of has had such splendid backing as the forestry troops in France. The \$4,000 sent seemed a fortune when it stood to our credit in a French bank for 22,400 francs. Almost 3,800 francs was assigned to work among the pioneer forestry engineers, the 10th Regiment. Athletic supplies, indoor games, phonograph records, needles, books, sheet music, refreshments for evening parties and other like necessities have been purchased with this fund. One of the large uses to which it has been put has been that of loans. The fund has been put out on loans several times over and has proved a friend indeed to men in need. It has made it possible for men to go out on leave; it has brought to men discharged from hospitals, who had not seen a pay day for



LISTER BAGS ("CARRIE NATION COWS") CONTAINING CHLORINATED WATER FOR DRINKING PURPOSES. BELLEVUE CAMP, PONTENX, LANDES, FRANCE

some time, pocket money to start them on the trip home. This fund has always meant that men and worthy objects could find financial assistance.

"The balance of the fund used distinctively for the 20th Engineers, after initial expenses for entertainment equipment had been provided, was divided among the different battalions on a per capita basis and used by the company commanders as they deemed best in supplying the various needs of their companies. These battalion funds have always been at the disposal of the battalion chaplain and have proven a great blessing.

"The thirty-eight phonographs bought from this fund and forwarded from the States to each one of the original engineer companies have found continual use, sending forth their melodious sounds from tents, barracks, old barns, dugouts, and often used in the open air. These phonographs have proven the opportunity for many a friend in the States to express his interest in us by forwarding phonograph records. I shall never forget standing in front of a dugout in Puvencelle Wood, in the midst of devastation, when suddenly there came upon my ear the voice of John McCormack as played on one of these machines. The contrast between this evidence of civilization and the absolute lack of it around me was tremendously striking.

"Warm clothing is always a necessity in the ever-present humidity of France. The sweaters made from the wool purchased by this fund are a daily comfort to these men, who often have labored all day long in torrents of rain, returning to their tents to find a good warm sweater waiting.

"During these days of waiting to come home, we are bending all our efforts to provide entertainment, parties, educational classes that will occupy the minds of the men and that shall prepare them for larger services in the future. We shall use this fund in every way to provide these events.

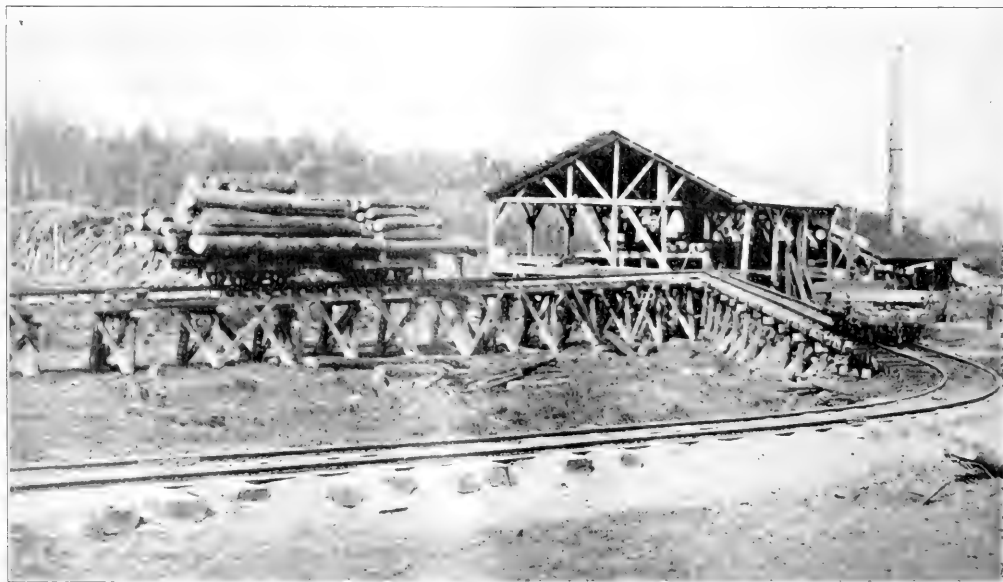
"Twenty thousand soldiers united with me in expressing gratitude to those who have made all these things a reality and a daily reminder of your interest."

The list of donations received by the Welfare Fund is published on pages 1168, 1173, 1175, 1177 and 1178.

HOW THE FOREST SERVICE HELPED

From the day that the 10th Engineers was organized the members of the Forest Service took a deep interest in the regiment and were anxious to find ways in which they might forward the comfort and happiness of the men. The Service had co-operated with the War Department in recruiting the regiment, and a great many of its men were on the regimental rolls. A suggestion that an ambulance would be of great value was seized upon with eagerness, and during the summer of 1917 contributions poured in from the members of the Forest Service in all parts of the country. A fund of \$4,274.68 was raised, more than enough to purchase two motor ambulances and two kitchen trailers. One of these ambulances and its trailer was paid for entirely by the Northwestern District. The remainder of the fund was used to buy a photographic developing outfit for the 10th Engineers and wool to be made into knitted garments.

In September, 1917, when the 10th was ready to leave



MARITIME PINE LOGS ON THE WAY INTO 20-M AMERICAN SAWMILL IN FOREST OF THE DUNE COUNTRY IN SOUTHWESTERN FRANCE

SIMONDS

SAW STEEL PRODUCTS



THE Naval Bureau of Ordnance designed, constructed in the United States, shipped and re-erected abroad, and placed in action on the fighting front, a battery of the finest guns used by any belligerent in the war. One of these is illustrated above.

Simonds Saw Steel was selected *exclusively* for the armor plate on this equipment and was supplied in *record-breaking time*, for the gun and the cars making up each complete gun unit.

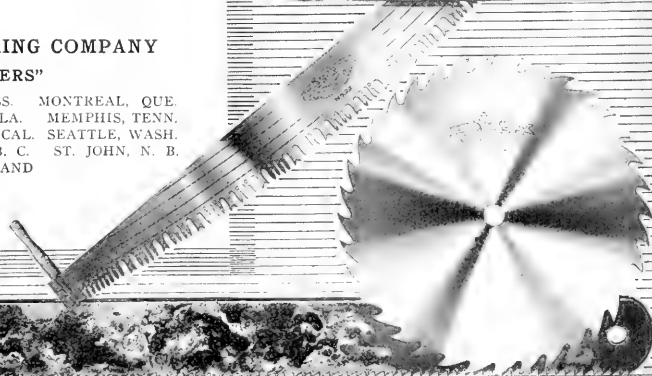
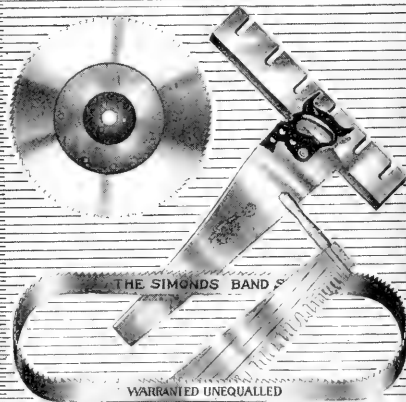
This steel was selected because at that time, early in 1918, it was a well-established fact that the Simonds Manufacturing Company had the best reputation for quality and the most up-to-date facilities for speed of any concern in the United States manufacturing this class of steel.

We also supplied enormous quantities of Simonds Cross-cut Saws, Hand Saws, and Circular Saws, Solid and Inserted Tooth. When you want saws, write us. Catalog sent on request.

SIMONDS MANUFACTURING COMPANY

"THE SAW MAKERS"

CHICAGO, ILL.	FITCHBURG, MASS.	MONTREAL, QUE.
NEW YORK CITY	NEW ORLEANS, LA.	MEMPHIS, TENN.
PORTLAND, ORE.	SAN FRANCISCO, CAL.	SEATTLE, WASH.
LOCKPORT, N. Y.	VANCOUVER, B. C.	ST. JOHN, N. B.
	LONDON, ENGLAND	



Simonds

Welcome Home 20th Engineers

Your noble work in The Great War is completed.

The great efforts you put forth—the great assistance rendered the A. E. F.—was largely instrumental in turning the tide of conflict and in speedily ending the war.

Your untiring efforts must now be devoted to reconstruction work in the good old U. S. A.

The lumber industry welcomes you home—there is a great need for your valuable services and assistance.

The future of the lumber business is indeed bright. Building operations have been greatly curtailed during your absence but with settled business conditions here great strides will be made in an effort to partially catch up.

You will be interested to learn that every man from this organization now in service will be furnished employment immediately upon receiving his discharge.

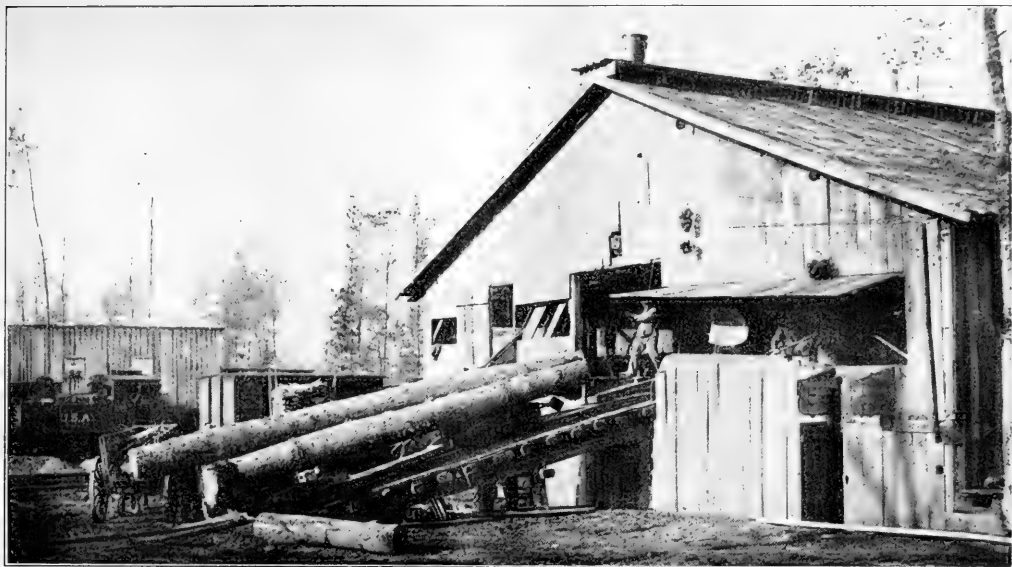
Crookston Lumber Company

SALES DEPARTMENT

903 First National-Soo Line Bldg.

Minneapolis, Minn.





SNAKING BIG LOGS, THREE AT A TIME, IN A BIG SAWMILL OPERATED BY THE AMERICAN FORESTRY ENGINEERS AT ST. DOZIER ON THE MARNE

for France, money was appropriated by the Department of Agriculture ambulance fund committee for the purchase of six phonographs and records to accompany them. The day the 10th left Washington these were bought and sent to the camp at American University in time to go across with the regiment.

In the fall of 1917 when knitting for soldiers began to be pushed vigorously by the Red Cross, the women of the Forest Service saw their opportunity and took up enthusiastically the making of knitted garments for the men of the Forest Regiments. Wool was bought with money left over from the ambulance fund, new funds were raised, and the work grew to such proportions that regular means had to be provided for handling the wool and distributing the garments. Early in November a women's committee was formed, with Mrs. Henry S. Graves as chairman and Mrs. Lilian T. Conway in charge of organization. This committee took over the purchasing of wool and other supplies, and the making of knitted garments and sending them to the men.

The supplying of comfortable woolen things was the main work of the women's committee. Of course, everybody knew that the lumberjack has plenty of experience in making the best of hardship and discomfort, and that the men of the Forest Engineers had gone to France ready and willing to endure many a visit from these old acquaintances. But frost-bitten toes and a chilly spinal column never made anyone's work improve, and so, as the Chaplain of the 10th put it, "the sound of sweaters in the making was received with great joy" over there.

The sweaters and other knitted garments, however, were not all. The purpose was also to promote cheerfulness in the camps, and one way of doing this was to

send Christmas things. The first work of this kind that the committee did was to get together, pack, and ship a large box of Christmas things donated by the members of the Washington office of the Forest Service. This box contained 126 knitted garments, 164 bags, 75 cans, and 18 packages of tobacco, 2,500 cigarettes, and a quantity of candy, chewing gum, and pocket flash lights. Special arrangements were made to have this box go forward with Red Cross shipments to France, and it was with considerable satisfaction that those who had packed it saw it start on its way on November 15. It did not arrive in time for Christmas. In fact, with this shipment began the difficulties with which the women's committee had to contend all through the war in getting its material into the hands of those for whom it was intended. The boys knew that the box was coming, but they had such a long wait before it arrived that fears began to be entertained that it had gone to the bottom with some torpedoed ship. At last came the word, in a letter dated June 26, 1917: "We received here yesterday a large Christmas box containing a splendid and most welcome assortment of things for the men. . . . I can not but remark with what accuracy of planning and dispatch the box reached us an even and exact six months after the date on which you proposed it should reach us. But not one regret is there, and not one man but is most delighted that the shipping authorities so cleverly divided our 'from home' Christmas pleasures half way between Christmases."

As the 20th Engineers was being organized, the battalions were encamped successively at American University, Washington, D. C. Practically every man in these battalions was supplied with a sweater, and many were

given socks, wristlets, scarfs, and helmets, through the efforts of the Forest Service in co-operation with the Potomac Division of the Red Cross. By March 18, 1918, the committee was able to announce that, with the assistance of the Red Cross, the 10th and 20th Engineers had been supplied with sweaters so that practically every man had one.

The success of the plan to outfit the Forest Engineers with knitted garments was due to the constant and enthusiastic support of the women of the Forest Service in Washington and throughout the western Districts. They kept at the knitting all the time, and continually asked for wool and then more wool. The only difficulty was keeping them supplied. The workers knitted enthusiastically all through the summer of 1918, and the sudden coming of the armistice in the fall found the storage space of the committee filled to overflowing. There was no way of getting these garments across to the Forest Engineers in France. In the fall and winter, with the approval of the committee in charge of the "Welfare Fund for Lumbermen and Foresters in War Service," the garments on hand were distributed to sailors, soldiers at St. Elizabeth's Hospital, hospital orderlies at Camps

Meade and Humphreys during the Spanish influenza epidemic, and the Serbian Relief Committee.

The War Department announced in the fall of 1918 that each soldier in the American E. F. would be allowed to receive one Christmas box, and that he would be given a label which would have to be put on the package before it could be shipped. This order suggested the possibility that there might be some men in the Forest Engineers without any one to whom they cared to send the label. A cablegram was sent by the treasurer of the Welfare Fund to the commander of the 20th Engineers offering to send Christmas boxes to any of the men in the regiment. Labels were received from 283 men. The purchasing of the articles to go into the boxes and the packing was done by ladies of the Forest Service. Special care was taken to provide, so far as the small size of the box permitted, a variety of articles which would be useful to the men and at the same time embody the spirit of Christmas cheer. A number of labels arrived after the Christmas ship had sailed for France. This was a source of great regret, but, as the next best thing to a box, each man whose label came too late was sent a money order and a Christmas card.

DONATIONS TO THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE

TOTAL, \$19,424.44

Achenbach, Naomi, Everett, Wash.	\$3.00	Blanchard Lumber Co., Boston, Mass.	25.00
Acorn Club, Seaford, Del.	5.00	Blanchard, A. F., West Acton, Mass.	10.00
The Acorn Lumber Co., Pittsburgh, Penna.	25.00	Blodgett Company, Grand Rapids, Mich.	10.00
Aberdeen Lumber Co., Pittsburgh, Penna.	25.00	The Blytheville Lumber Co., Blytheville, Ark.	25.00
Albert Hanson Lumber Co., Garden City, La.	100.00	Bodwell, Don R., Kansas City, Mo.	1.00
Alexander Bros., Belzoni, Miss.	5.00	In Memory of S. G. B.	10.00
Alexandria Lumber Co., Alexandria, La.	50.00	Bogert, Miss Anna, New York City	2.00
Allen Mfg. Co., Shreveport, La.	50.00	S. H. Bolinger & Co., Shreveport, La.	50.00
The Edmond A. Allen Lumber Co., Chicago, Ill.	5.00	Bomer Blanks Lumber Co., Blanks, La.	5.00
Allen, E. T., Portland, Ore.	5.00	Borreson, Jules T., Pine Bluff, Ark.	10.00
Amsler, Col. C. W., Clarion, Penna.	10.00	Boswell, T. S., Asheville, N. C.	5.00
Anderson-Tully Co., Vicksburg, Miss.	15.00	Bosworth & Son, F. S., Elgin, Ill.	10.00
Angelina County Lumber Co., Kettys, Tex.	10.00	Bounds, J.	2.00
Arkansas Land & Lumber Co., Malvern, Ark.	25.00	Bowling Lumber Co., Bowie, La.	100.00
Arkansas Short Leaf Lumber Co., Pine Bluff, Ark.	10.00	Boyd, James (received through Mr. Tennant)	5.00
Ascension Red Cypress Co., Ltd., New Orleans, La.	25.00	Bradley, E. J., Pottsville, Penna.	5.00
Asheville, N. C., Members of Hood-Hoo (received through Mr. Tennant)	10.55	Brady, J. E. (through E. D. Tennant)	1.00
E. C. Atkins & Co., Memphis, Tenn.	10.00	Brendon, Robert, Woodcliff-on-Hudson, N. J.	2.00
Atwater, Henry, Bridgeport, Conn.	5.00	The Bribe-Boone Lumber Co., Savannah, Ga.	2.00
Bach, J. N., Fairbury, Ill.	5.00	Brooks-Scanlon Co., Kentwood, La.	25.00
Badger Lumber Co., Kansas City, Mo.	10.00	Brooks, Bertha G., New York City	2.00
Baldwin Lumber Co., Baldwin, La.	25.00	Brown Lumber Co., Shamrock, La.	25.00
Bannister, F. J. O., Kansas City, Mo.	5.00	Brown, W. George, Memphis, Tenn.	5.00
Barage Lumber Co., Barage, Mich.	10.00	Brown, Mrs. Harry G., Columbia, Mo.	1.00
Bard, Anna G., Hueneme, Calif.	2.00	W. P. Brown & Sons Lumber Co., Louisville, Ky.	25.00
Barnes, Miss Anne Hampton, Devon, Penna.	20.00	Brown, W. R., Berlin, N. H.	500.00
Barr-Holiday Lumber Co., Louise, Miss.	25.00	Brownell-Drews Lumber Co., Morgan City, La.	25.00
E. P. Barton Lumber Co., Charleston, S. C.	50.00	Brownell, R. G., Williamsport, Pa.	25.00
Basilian Lumber Co., Isabela, Basilan, P. I.	50.00	Bruner, E. Murray, Rio Piedras, Porto Rico	5.00
Batcheller, Robert, Washington, D. C.	25.00	Bullard, F. F. (through E. D. Tennant)	5.00
Batson-McGeehe Co., Inc.	10.00	Burton-Schwartz Cypress Co., Burton, La.	100.00
Baxter Lumber Co., Wildsboro, La.	10.00	J. H. Burton & Co., Washington, D. C.	5.00
Bayou Land & Lumber Co., Yazoo City, Miss.	10.00	Buschow Lumber Co., Kansas City, Mo.	10.00
Beal, Mrs. James H., Boston, Mass.	2.00	Butler, Miss Virginia, Stockbridge, Mass.	5.00
Beckwith, Mrs. Daniel, Providence, R. I.	25.00	Cabot, Mrs. William R., Boston, Mass.	4.00
Beckwith, Isbon T., New York City	10.00	Carey, Miss G. S., Boston, Mass.	5.00
Bebe, W. M., Kansas City, Mo.	5.00	W. M. Cady Lumber Co., McNarry, La.	100.00
Beigham, L. F., Chestnut Hill, Mass.	12.00	Calcasieu Long Leaf Lumber Co., Lake Charles, La.	75.00
J. A. Bell Lumber Co., Lake Charles, La.	40.00	The Caldwell Lumber Co., Oil City, Penna.	2.00
Belgrade Lumber Co., Louise, Miss.	10.00	Cale, D. E., Wichita, Kansas	50.00
Bemis, H. C., Bradford, Penna.	25.00	Carey, Arthur E., Boston, Mass.	5.00
Bemis, J. M., Boston, Mass.	1.00	Carpenter, Mrs. Charles J., New Brunswick, N. J.	4.00
Berwick, Seth E., Chicago, Ill.	5.00	Carrier Lumber & Mfg. Co., Sardis, Miss.	25.00
Berwind, John, New York City	5.00	Carter, E. T., New York City	1.00
The Blithmore (by Mr. H. D. House, Albany, N. Y.)	100.00	Carey, Miss G. S., Boston, Mass.	5.00
Birkle, John A., Williamsport, Penna.	5.00	Case Fowler Lumber Co., Macon, Ga.	20.00
Bissell, John H., Detroit, Mich.	10.00	Central Lumber Co., Shreveport, La.	5.00
Blackman, W. R., Los Angeles, Calif.	3.00	Central Penna. Lumber Co., Williamsport, Pa.	250.00
Blake, George B., Lenox, Mass.	25.00	Chace, Fenner A., Fall River, Mass.	5.00

WILLAMETTE

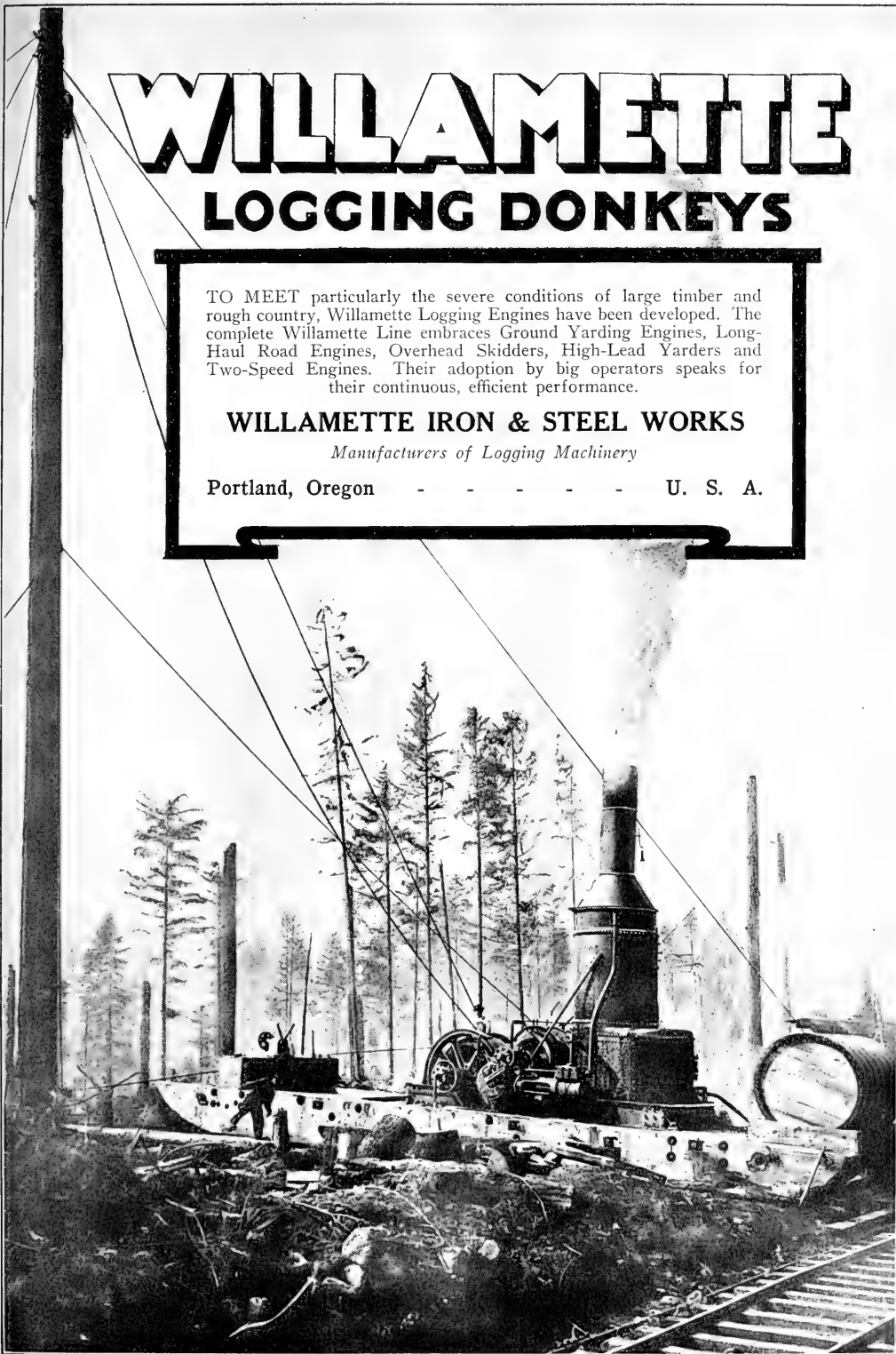
LOGGING DONKEYS

TO MEET particularly the severe conditions of large timber and rough country, Willamette Logging Engines have been developed. The complete Willamette Line embraces Ground Yarding Engines, Long-Haul Road Engines, Overhead Skidders, High-Lead Yarders and Two-Speed Engines. Their adoption by big operators speaks for their continuous, efficient performance.

WILLAMETTE IRON & STEEL WORKS

Manufacturers of Logging Machinery

Portland, Oregon - - - - - U. S. A.



Buy Yellow Pine Lumber Because It Is Good

NOT BECAUSE CHEAP

You wouldn't buy clothes or food on price alone? Then why do you let material go into your **home**, only because it is the cheapest?

There is a great deal of difference between well manufactured Yellow Pine lumber from high class forests, cut by responsible experienced producers, (who will continue in business many years) and the "other kind."

ASK YOUR DEALER

"Does the Yellow Pine Structural and Finish lumber going into my construction come from mills like these"

LOUISIANA LONG LEAF LUMBER CO.
Fisher, La. 2 Plants.
K. C. Southern R. R.
Victoria, La. 1 Plant.
T. & P. R. R.

FOREST LUMBER CO.
Oakdale, La. 1 Plant.
Mo. Pac. R. R. and Gulf Colorado &
Santa Fe R. R.

NOW BUILDING
WHITE-GRANDIN LUMBER CO.
Slagle, Louisiana
K. C. S. R. R.

LOUISIANA CENTRAL LUMBER CO.
Clarks, La. 2 Plants.
Mo. Pac. R. R. and T. & G. R. R.
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Mo. Pac. R. R.

LOUISIANA SAWMILL CO., INC.
Glenmora, La.
Mo. Pac. R. R. and Red River & Gulf
conn. with T. & P., R. I. and S. P.

Combined Capacity, 1,000,000 Feet Daily

Missouri Lumber & Land Exchange Co.

J. B. WHITE, Pres. and Genl. Mgr.

Long and Short Leaf Yellow Pine

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R. A. Long Building

KANSAS CITY, MO.





**USE
Victory
Bread
SAVE
WHEAT**

USE Victory Bread — save wheat. That's an important obligation with you now.

When you have it toasted—just right, and buttered hot, you'll find that this "substitute" bread has a lot more flavor.

Toasting brings out flavor—every time. It makes tobacco delicious. Try Lucky Strike Cigarette—it's toasted.

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**It's
toasted**

Save the tin-foil from Lucky Strike Cigarettes and give it to the Red Cross



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BOGALUSA BOGALUSA BOGALUSA

"The New South's Young City of Destiny."
Site of the world's largest saw-mill, 1,000,000 feet
daily cut. (And still time left to be interested in YOU.)

"The New South's Young City of Destiny."
"Some" lumber plant!—occupies 260 acres and re-
quires a mill-pond of 27 acres. Cuts 1,000,000 feet a day.

"The New South's Young City of Destiny."
Where 250,000 logs of "extra dense," really superior
long-leaf pine logs are sawed up every month.

BOGALUSA
"The New South's Young City of Destiny."
What do you pay?—\$100,000. (31/2 per cent. Write the Mayor.
deposits are \$1,000,000.)

BOGALUSA
"The New South's Young City of Destiny."
Where lumber decks total 18,000 lineal ft., with 60 miles
of train track. Plant operated on own refuse only.

BOGALUSA
"The New South's Young City of Destiny."
New one on me. Well, it has 15,000 people. 11 years
ago it's site was a pine forest. Mayor knows why.

BOGALUSA

"The New South's Young City of Destiny."
Tourists in New Orleans, phone Great Southern Lum-
ber Co., Bogalusa, for guides and Southern welcome.

A Salute to the Heroes of the 20th Engineers:

You have contributed a big part of the
biggest job ever done by men in the
history of creation.

You have distinguished yourselves,
loved your families, honored your
country and given lustre to the great
industry from which you went—with
courage, patriotism, fidelity *and brains*
and skill the best ever.

The greatest lumber operation in the
world welcomes back home the greatest
group of actual and potential heroes in
the world.

Bogalusa is wide open to you. And the
terms of employment are intended to
express the above sentiments. *Bogalusa*
led all Southern industrial cities in all
war work—our boys won their honors
"over there." Nobody "has anything
on us." Write us in the spirit of this
statement. We will reply in a parallel
spirit. Try us. *Write the Mayor.*

"Bogalusa is the best bet in America."

Ask us about
conditions here.
You will get a
truthful reply.

BOGALUSA

"The New South's Young City of Destiny."
Never heard of it? Well, the pay-roll of Bogalusa's
Industries is \$250,000 monthly. Write the Mayor.

BOGALUSA
"The New South's Young City of Destiny."
New paper mill cost \$1,500,000. Y. W. C. A. Bldg.
\$35,000. Y. M. C. A., \$50,000. Armory, \$12,000.

BOGALUSA
"The New South's Young City of Destiny."
Site of largest wood-pulp paper plant in the U. S. A.
(as well as the largest lumber operation on earth).

BOGALUSA
"The New South's Young City of Destiny."
It's where the Great Southern Lumber Co. takes up
and lays a mile of railway track daily (60 m. total).

GREAT SOUTHERN LUMBER COMPANY

1628 4th Ave., Bogalusa, La.

BOGALUSA BOGALUSA BOGALUSA

"The New South's Young City of Destiny."
Where 700,000 railway cross-ties are made yearly.
And the poor little box-shooks run 50 cars a month.

"The New South's Young City of Destiny."
If in New Orleans don't miss this revelation of Amer-
ican energy and foresight. Take N. O. & G. N. Ry.

"The New South's Young City of Destiny."
That PINE TREE INN equals anything I've seen.
Who'd expect such a hotel in a city you never heard of."

THE SOUTHERN PINE ASSOCIATION

Is an organization composed of 230 Southern Pine mills located in 9 Southern States, producing 6 billion feet of lumber annually. The foundation of the Association is

"S-E-R-V-I-C-E"

Service to the consumer by educating him to the proper uses of Southern Pine and its qualities; and protecting him in his purchases by the maintenance of uniform grades.

Service to its subscribers through its Executive, Advertising, Inspection, Traffic, Cut-Over Land, Safety First, Engineering, Accounting and Statistical Departments.

Service to the dealer by bringing to his attention the most improved methods of merchandizing and by creating markets for his goods through advertisements in national and local publications.

Southern Pine Association

NEW ORLEANS, LA.



Chaffee, R. R., Endeavor, Penna.....	5.00	Fearing, Harriet, Baltimore, Md.....	4.00
Chapman, H. H., Albuquerque, N. Mex.....	1.00	Ferd, Brenner Lumber Co., Alexandria, La.....	25.00
Chapman, S. F., Asheville, N. C.....	25.00	Ferguson-Palmer Co., Houlika, Miss.....	10.00
Cherry River Boom & Lumber Co., Scranton, Penna.....	100.00	J. A. Ferguson, State College, Penna.....	2.50
Churchill-Milton Lumber Co., Glendora, Miss.....	10.00	Fernov, Dr. B. E., Toronto, Canada.....	10.00
Clark, Edgar J., Kansas City, Mo.....	5.00	Fernwood Lumber Co., Fernwood, Miss.....	100.00
J. S. H. Clark Lumber Co., Wadesboro, N. C.....	10.00	Finch, Pruyn & Company, Glens Falls, N. Y.....	125.00
Cleveland Oconee Lumber Co., Atlanta, Ga.....	10.00	Fisher, Archie (through E. D. Tennant).....	5.00
Colby, Forest H., Augusta, Maine.....	2.00	Tommy and Betty Fleming, Pittsburgh, Penna.....	25.00
The P. N. Coleman Lumber Co., Savannah, Ga.....	5.00	Fleming, J. J., Mrs. Thomas, Pittsburgh, Penna.....	1.00
Colfax Lumber Co., Colfax, La.....	5.00	Flecher, Elmer D., Gorham, Mass.....	5.00
Comfort Lumber Co., The George N., Cleveland, Ohio.....	10.00	Foley, William F., Philadelphia, Penna.....	20.00
Commercial Box Co., New Kensington, Penna.....	5.00	Forest Lumber Co., Oakdale, La.....	100.00
Comstock, Walter J., Washington, D. C.....	10.00	Fernwood Products Chemical Co., Erwin, Miss.....	5.00
The Conewango Lumber Co., Warren, Penna.....	5.00	Forest Service, Denver, Colo.....	350.00
The Conklin-Reuling Co., Pekin, Ill.....	5.00	Fosburgh Lumber Co., Norfolk, Va.....	15.00
Cooney, Eckstein & Co., Inc., Savannah, Ga.....	5.00	Foster Lumber Co., Kansas City, Mo.....	10.00
S. P. Coppock & Sons Lumber Co., Fort Wayne, Ind.....	10.00	Freund, John C., New York City.....	10.00
Cornell Foresters, Ithaca, N. Y.....	5.00	From One of the Amexforce.....	2.00
Cornu, Theodore J., New York City.....	10.00	Frost-Johnson Lumber Co., Shreveport, La.....	75.00
Cotton Bros. Cypress Co., Morgan City, La.....	10.00	Fuellhart, W. O., Endeavor, Penna.....	10.00
Crosby, J. B., Chicago, Ill.....	5.00	Gaylord, Miss Bertha R., Branford, Conn.....	5.00
The B. W. Cross Lumber Co., Pittsburgh, Penna.....	5.00	Gayoso Lumber Co., Memphis, Tenn.....	10.00
Crowell & Spencer Lumber Co., Long Leaf, La.....	50.00	Geisler, Max, Des Moines, Iowa.....	5.00
Cruikshank, Douglas M., Brooklyn, N. Y.....	1.00	Gelpcke, Miss A. C., Brooklyn, N. Y.....	5.00
Culver, H. C., Spokane, Wash.....	50.00	Georgia-Florida Yellow Pine Emergency Bureau, Jacksonville, Fla.....	5,000.00
The Cummings-Moberly Cypress Co., Moberly, La.....	50.00	C. L. Gray Lumber Co., Meridian, Miss.....	25.00
Curtis, Miss C. G., Intervale, N. H.....	2.00	Great Southern Lumber Co., Bogalusa, La.....	100.00
Dalziel & Allen Lumber Co., Pittsburgh, Penna.....	5.00	Green, Thornton A., Ontonagon, Mich.....	5.00
Dalziel, L. H., Boston, Mass.....	12.00	Grenshaw-Gary Lumber Co., Richey, Miss.....	10.00
Daniels, C. D., Hoquiam, Wash.....	2.00	Griffiths & Co., Dallas, Texas.....	5.00
L. N. Dantzier Lumber Co., Moss Point, Miss.....	100.00	Grogan Lumber Co., Boston, Mass.....	25.00
J. W. Darling Lumber Co., Wilhelm, La.....	50.00	Guild, Katharine, Miss E., Brookline, Mass.....	2.00
Darnell-Lovex Lumber Co., Leland, Miss.....	10.00	Gulf Lumber Co., Fullerton, La.....	175.00
Darnell Lumber Co., Batesville, Miss.....	10.00	Gunnison National Forest, Gunnison, Colo.....	25.00
Delafield, J., Marturra, L., Paris, France.....	5.00	Hagenbach, G. F., Spirit Lake, Idaho.....	25.00
Delph Lumber Co., Savannah, Ga.....	5.00	Haight, Mrs. C., Lewis, Mass.....	5.00
Devereux, Miss M. S., Atascadero, Calif.....	5.00	H. H. Hall Lumber Co., New Albany, Miss.....	10.00
DiBert, Stark & Brown Cypress Co., Donner, La.....	100.00	Hammond Lumber Co., Ltd., Hammond, La.....	15.00
Dickson, J. W., (through E. D. Tennant).....	2.00	Haskell, Rev. Joseph N., Nashville, Tenn.....	2.00
Dock, Miss Mira L., Fayetteville, Penna.....	5.00	Hatcher, John H., Kansas City, Mo.....	2.50
Dollar Bay Lumber Co., Dollar Bay, Mich.....	10.00	Hatcher, J. S., Curtis, Nebr.....	2.50
F. T. Dooley Lumber Co., Walls, Miss.....	5.00	Hatcher, W. A., Venango, Nebr.....	5.00
Dorman, F. S., (through E. D. Tennant).....	1.35	Hay, Clarence, New York City.....	7.00
Douglas Fir Club, San Francisco, Calif.....	520.00	Hayes, Mrs. C. R., Philadelphia, Pa.....	10.00
Douglas Fir Exploitation & Export Company, San Francisco, Calif.....	50.00	Hayes, Rutherford P., Asheville, N. C.....	10.00
Dover, Del., Century Club, Dover, Del.....	5.00	Hebard Cypress Co., Scranton, Penna.....	100.00
Downman, Robert H., Washington, D. C.....	500.00	Hebard, D. L., Philadelphia, Pa.....	20.00
Dugan Lumber Co., Roundaway, Miss.....	10.00	Henze, W., Iron Mountain, Mich.....	5.00
Duncan Shingle & Lumber Co., Kansas City, Mo.....	10.00	The Herman H. Hettler Lumber Co., Chicago, Ill.....	25.00
Dunham, Miss M. V., Chicago, Ill.....	105.00	B. F. Hiestand & Sons, Marietta, Penna.....	50.00
Eastman, Gardiner & Co., Laurel, Miss.....	100.00	Higgins Lumber Co., Pittsburgh, Penna.....	25.00
Eckert, Harry K., Niagara Falls, N. Y.....	15.00		
Ellis Bros., Inc., Buffalo, N. Y.....	50.00		
Ellington & Guy, Inc., Richmond, Va.....	10.00		
Egypt Hardwood Lumber Co., Vernon, Miss.....	15.00		
Faust Bros. Lumber Co., Jackson, Miss.....	15.00		

American Black Walnut

The most beautiful of all Cabinet woods

¶ In furniture or interior trim no wood is more pleasantly attractive—

¶ Walnut did its part in winning the war, every American soldier who carried a rifle being promptly supplied. The gunstocks were of walnut and the walnut producers saw that the government rifle factories were furnished the material.

5,000,000 feet of Walnut now on hand—all grades and dimensions

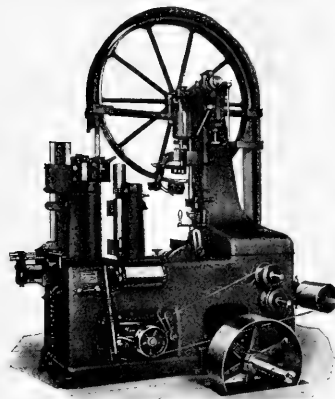
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NEW STANDARD 54-INCH BAND RESAW

26 Models for Sawmills, Planing Mills,
Box Factories and Cabinet Plants

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MICH.

Hirsch Lumber Co., Savannah, Ga.	5.00	Lodwick Lumber Co., Shreveport, La.	20.00
Hirst, Mary S., Concord, N. H.	100.00	Long Bell Lumber Co., Kansas City, Mo.	10.00
Hixon, J. M., Pasadena, Calif.	25.00	Long Pine Lumber Co., Alexandria, La.	25.00
Hoar, D. Blackley, Brookline, Mass.	5.00	Longville Lumber Co., Longville, La.	100.00
Holmes, J. S., Chapel Hill, N. C.	5.00	The Lothmen Cypress Co., St. Louis, Mo.	50.00
Holly Ridge Lumber Co., Holly Ridge, La.	10.00	Lothman, William, St. Louis, Mo.	50.00
Home Bldg. & Material Co., Asheboro, N. C.	25.00	Louisiana Cypress Lumber Co., Harvey, La.	50.00
Hopson, Raymond E., Old Forge, N. Y.	25.00	Louisiana Long Leaf Lumber Co., Fisher, La.	100.00
Hosmer, Mrs. George Herbert, Ithaca, N. Y.	2.00	Loveljoy, P. S., Ann Arbor, Mich.	5.00
Hosmer, Ralph S., Ithaca, N. Y.	10.00	Lowell, Mary E., Chestnut Hill, Mass.	7.00
Houma Cypress Co., Houma, La.	50.00	Ludington Lumber Co., Ludington, La.	10.00
Howard, W. G., Albany, N. Y.	5.00	Lufkin Land & Lumber Co., Lufkin, Tex.	10.00
Hudson River Lumber Co., De Ridder, La.	72.30	Luther Moore Cypress Co., Luther, La.	75.00
Huef-Hodge Lumber Co., Hodge, La.	25.00	Lyon Lumber Co., Garyville, La.	100.00
Hungerford, H. (through E. D. Tennant)	1.00	McCarroll Lumber Co., Ltd., Holden, La.	12.00
Huston, H. B. (through E. D. Tennant)	5.00	McCormick, Mrs. D. C., Pittsburgh, Penna.	1.00
Hyde Lumber Co., Lake Providence, La.	10.00	McCoy & Son, Inc., George A., Pleasant Lake, N. Y.	10.00
Ill. Lumber & Bldg. Supply Dealers' Association	25.00	McElwee, W. H., Raleigh, N. C.	10.00
Indiana Quartered Oak Co., New York City	25.00	McGraw & Curran Lumber Co., Yazoo City, Miss.	10.00
Industrial Lumber Co., Oakdale, La.	25.00	McKenna, H. E. (through E. D. Tennant)	7.00
S. W. Iowa Retail Dealers (through E. D. Tennant)	38.55	McNair, C. I., Cloquet, Minn.	1.00
Ives, Mrs. T. M., New York City	7.00	Martin, Miss Annie D., Flat Rock, N. C.	5.00
Jeanerette Lumber & Shingle Co., Jeanerette, La.	100.00	Maurice, C. S., Athens, Penna.	25.00
Johnson, Eliz. W., Pasadena, Calif.	5.00	Maddox, R. S., Nashville, Tenn.	5.00
Johnson, J. W., Panther Burn, Miss.	20.00	The S. W. Means Lumber Co., Pittsburgh, Penna.	5.00
W. F. Johnson Lumber Co., Natchitoches, La.	25.00	Memphis Bank Mill Co., Memphis, Tenn.	5.00
Jordan River Lumber Co., Kiln, Miss.	100.00	C. C. Menget & Bros. Co., Louisville, Ky.	25.00
Kaighn, Robert, Philadelphia, Penna.	10.00	Menominee White Cedar Co., Marinette, Wisc.	10.00
Kellogg, R. S., New York City	10.00	Merkel, Hermann W., New York City	5.00
J. S. Kent Co., Philadelphia, Penna.	10.00	Merritt Bros., Inc., Reading, Penna.	25.00
Kent, W. H. B., Cazonovia, N. Y.	10.00	The John D. Mershon Lumber Co., Saginaw, Mich.	25.00
G. F. Kerns Lumber Co., Chicago, Ill.	5.00	Mershon, W. B., Saginaw, Mich.	10.00
Keystone Lumber Co., Pittsburgh, Penna.	50.00	Milne, Hall and Johns Co., Inc., Cincinnati, Ohio.	25.00
A. S. Kibbee & Son, Albany, N. Y.	100.00	Minden Lumber Co., Minden, La.	25.00
Kidder, Nathaniel T., Milton, Mass.	5.00	A Friend	5.00
King Lumber & Mfg. Co., Nocatee, Fla.	5.00	Mississippi Hardwood Co., Jackson, Miss.	5.00
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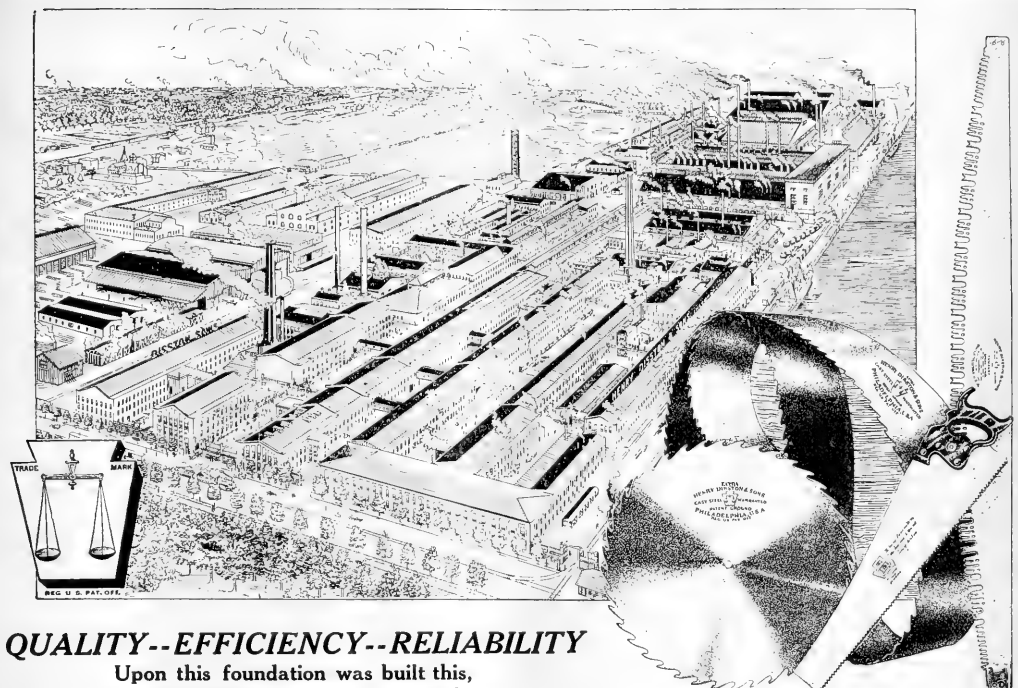
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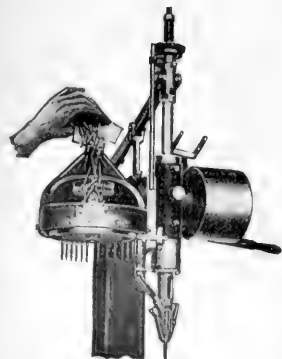
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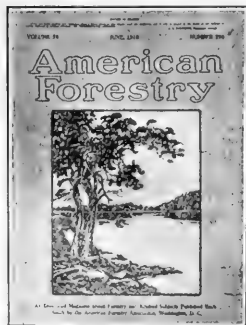
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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigation, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

HELP TO REFOREST FRANCE

THE AMERICAN FORESTRY ASSOCIATION HAS UNDERTAKEN THE GREAT TASK OF HELPING TO REFOREST THE SHELL-TORN, WAR-SHATTERED AREAS OF FRANCE; AND TO AID ALSO GREAT BRITAIN, HALF OF WHOSE FORESTS WERE FELLED; BELGIUM, WHOSE FORESTS SUFFERED TERRIBLY, AND ITALY.

THE GREAT HUMANITARIAN NEED, THE PRIME ECONOMIC IMPORTANCE, THE BROAD CONSTRUCTIVE VALUE OF THIS WORK—ALL PLACE IT ON A PLANE WHICH GIVES IT STRIKING PRE-EMINENCE. THEREFORE, IT IS FELT THAT EVERY MEMBER OF THE AMERICAN FORESTRY ASSOCIATION WILL DESIRE TO HAVE A PART, AND AS BIG A PART AS POSSIBLE, IN CARRYING OUT THIS PROGRAM.

BY THOSE WHO ARE COMPETENT TO JUDGE, IT IS ASSERTED THAT THE FORESTS OF FRANCE KEPT THE GERMANS FROM PARIS. HOW GREAT A DEBT, THEN, DOES THE WORLD OWE TO THEM!

AMERICA CAN BUILD NO NOBLER MEMORIAL IN EUROPE THAN BY REPLACING THE DEVASTATED FORESTS OF FRANCE, GREAT BRITAIN, BELGIUM AND ITALY. ANSWER THIS APPEAL AT ONCE BY SENDING YOUR CHECK FOR WHATEVER AMOUNT YOU CAN AFFORD, TO THE AMERICAN FORESTRY ASSOCIATION. IT WILL HELP TO PURCHASE THE SEED NEEDED TO REPLANT THE FORESTS OF OUR ALLIES.

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THOUSANDS ARE ASKING WHAT IS BEING DONE TO PERPETUATE OUR FORESTS SO AS TO PREVENT THE EXHAUSTION AND TO PREVENT TIMBER PRICES FROM BECOMING PROHIBITIVE LATER ON.

THE ANSWER IS THAT THE PROBLEMS OF FOREST PROTECTION AND FOREST PERPETUATION ARE NOT BEING MET. NEITHER THE PRESENT NOR THE FUTURE PUBLIC NEEDS FOR FORESTS AND THEIR BENEFITS ARE BEING PROVIDED FOR.

WE HAVE OUR NATIONAL FORESTS AND SOME STATE FORESTS, BUT THEY ARE NOT EXTENSIVE ENOUGH NOR WELL ENOUGH DISTRIBUTED TO DO MORE THAN MEET A SMALL PART OF OUR FOREST NEEDS.

THE BULK OF OUR FORESTS ARE PRIVATELY OWNED, AND THESE ARE NOT BEING ADEQUATELY PROTECTED NOR ARE STEPS BEING TAKEN TO PERPETUATE THEM. DESTRUCTIVE PROCESSES GO ON UNCHECKED.

IN MANY PARTS OF THE COUNTRY LITTLE OR NO EFFORT IS MADE EVEN TO PROTECT THE FORESTS FROM FIRE. PRIVATE OWNERS DO NOT TRY TO SECURE NATURAL REPLACEMENT OF YOUNG TREES IN PLACE OF THE OLD TIMBER. SUCH FOREST REPRODUCTION AND GROWTH AS OCCURS IS ACCIDENTAL AND IN SPITE OF FOREST ABUSE. ALMOST NONE OF IT IS OBTAINED BY CONSCIOUS EFFORT ON THE PART OF THE OWNERS. THE AGGREGATE OF ALL THE GROWTH IS PROBABLY NOT OVER 30 PER CENT OF WHAT WE CUT, USE, AND DESTROY.

IN SHORT, WE ARE ACTUALLY USING UP OUR FOREST RESOURCES WHEN WE MIGHT HAVE BEEN GROWING FORESTS AT A RATE TO ENABLE US TO CUT THE MATURING TREES FREELY AND WITH CERTAINTY OF A SUSTAINED FOREST WEALTH TO CONTINUE OUR INDUSTRIES AND TO MEET OUR DOMESTIC NEEDS.

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Roof planks of textile-mill destroyed by decay in nine years.

(Courtesy F.J. Hoxie, eng., Associated Factory Mutual Fire Insurance Cos., Boston.)

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pairs to roofs. Every mill should be equipped with a simple open tank creosoting plant, and all timber and boards which will be placed in a situation favorable to development of decay, should be creosoted.



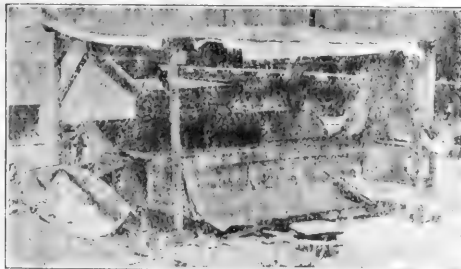
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Permanent portable plant built by large paper mill for creosoting roof boards and miscellaneous lumber. (a) Tank for hot treatment. (b) Tank for cold treatment. (c) Tank for catching drippings.

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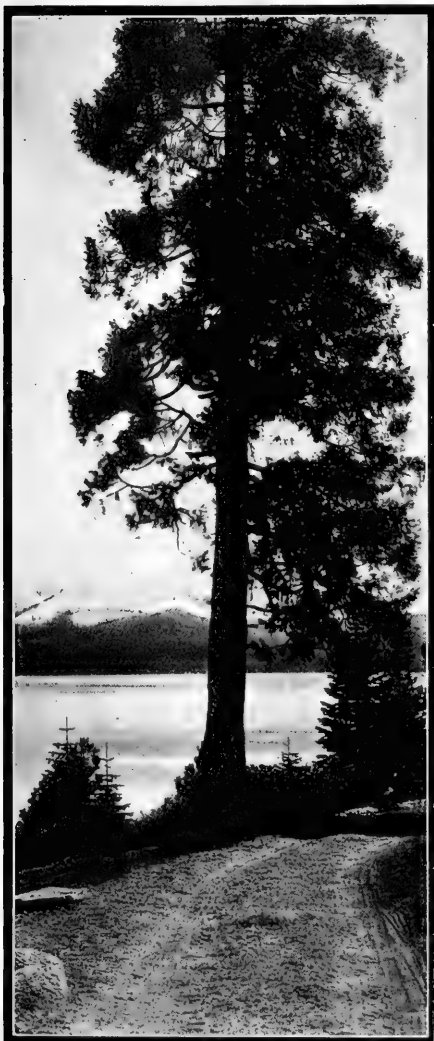
THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

JULY 1919 VOL. 25

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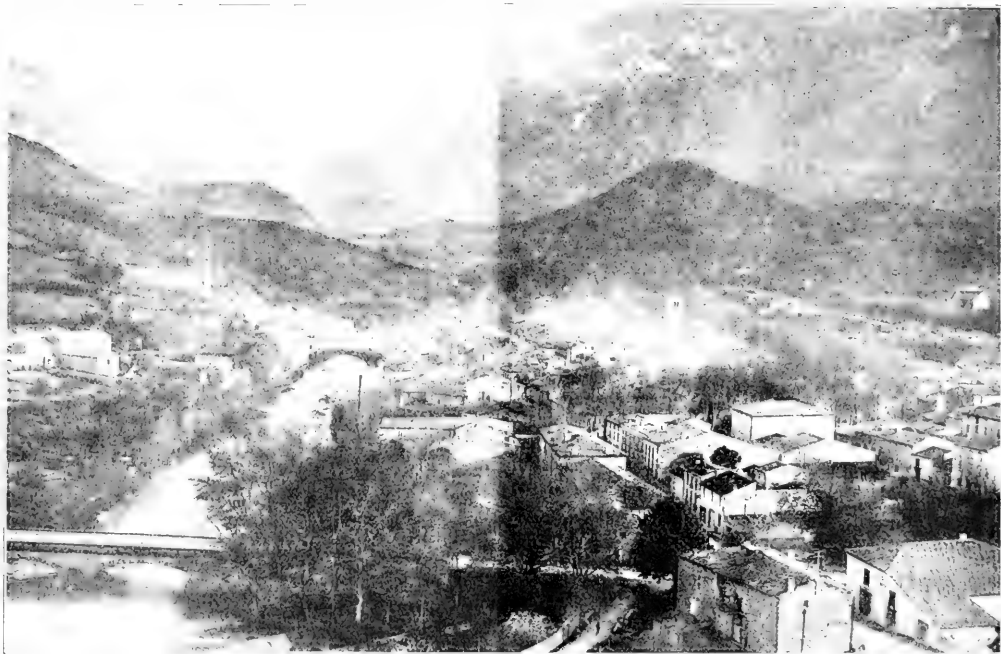


A BEAUTY SPOT ON LAKE TAHOE

This is a typical road, lake and mountain scene in the wonderful Tahoe country in Nevada.

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A VIEW OF THE TOWN OF QUILLAN, EASTERN PYRENEES, WHICH MAJOR STUART DECLARES IS THE HOME OF THE BEST FRENCH COOKS AND OF A HIGH GRADE OF PATE DES FOIE GRAS (PAGE 1193)



THE ENTRANCE OF THE TUNNEL NEAR QUILLAN, IN THE EASTERN PYRENEES, INTO THE GORGE WHICH IT HAS CARVED FOR ITSELF IN PASSING TO THE SEA (PAGE 1193)

AMERICAN FORESTRY

VOL. XXV

JULY, 1919

NO. 307

FORESTERS AND LUMBERMEN HOME FROM FRANCE

BY MAJOR DAVID T. MASON, 20th ENGINEERS (FORESTRY)

AND

PERCIVAL SHELDON RIDSDALE, EDITOR OF AMERICAN FORESTRY MAGAZINE

PRACTICALLY all of the foresters and lumbermen sent to France as members of the Twentieth Engineers (Forestry) have returned home and been discharged from the service. They came back with the knowledge that they accomplished the job which was given them, that of supplying the United States Army with all the lumber and fuel wood it required, in a manner which won the admiration of all who know of the unceasing demands made upon them and of the difficulties which they had to overcome. They worked with the spirit which wins success and they return with an experience and a training which will greatly increase their ability and render them much more capable than they ever were before of doing whatever work is assigned to them.

The men who before the war were employed by the Forest Service will return to the Service in the same

or better positions, those who gave up jobs with lumber companies learn that their jobs or better ones are waiting for them, and men of other vocations who joined the forestry and lumber regiment will have no difficulty in obtaining work, for their two years' training in France has made them better men in every way.

The first of these forest and lumber troops arrived in France in October, 1917. The units comprised approximately twelve hundred men. By the end of the month the several detachments into which the regiment was divided were at work in forests in eastern, southwestern, northwestern and central France. During the long wait for the sawmill equipment there was much preliminary work to be done, such as establishing camps, building roads, cutting and decking logs. A number of small French mills were leased or bought to start lumber production. The other units began to arrive at their stations

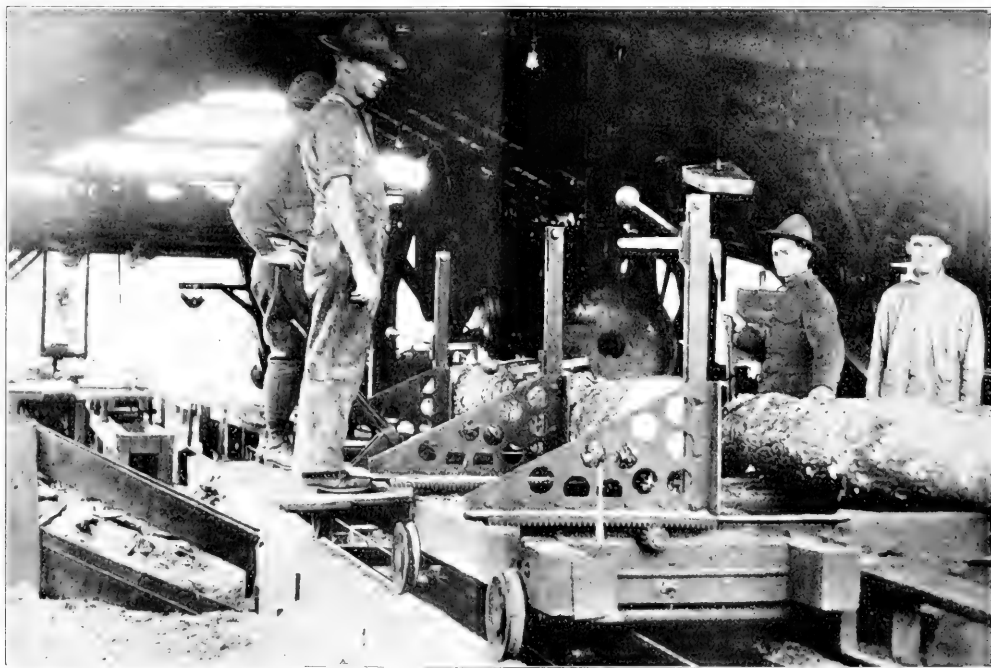


MARITIME PINE LOGS BEING UNLOADED FROM NARROW GAUGE CARS INTO MILL POND IN PINE FORESTS IN SOUTHWESTERN FRANCE. AMERICAN 20-M MILL IN BACKGROUND

in France in December, 1918, and there was a steady flow of forest and lumber troops from America to France until by midsummer, 1918, there were about eighteen thousand Americans at work in the French forests. From the small amount of timber produced at first the output increased rapidly until for the month of September, 1918, it consisted of forty-two million feet of sawn material, including four hundred forty thousand railway ties, of thirty-six hundred pieces of piling mostly over fifty feet long, of five hundred sixty thousand poles and of thirty-eight thousand cords of fuel. By this time there were eighty-one American sawmills at work. But

able record in lumber production. At Pontenx, a lumber camp near Bordeaux, a set of curves showed graphically just what each shift at each mill accomplished each day; each shift and each mill was trying for the high record, and the palm often changed hands. High monthly records were more prized than high daily records. To keep up the interest between districts in which the lumberjacks were working, the central office of the regiment at Tours sent out each month the records for each of the eighty-one American mills finally operating in France.

The best single day record is that of the twenty-M



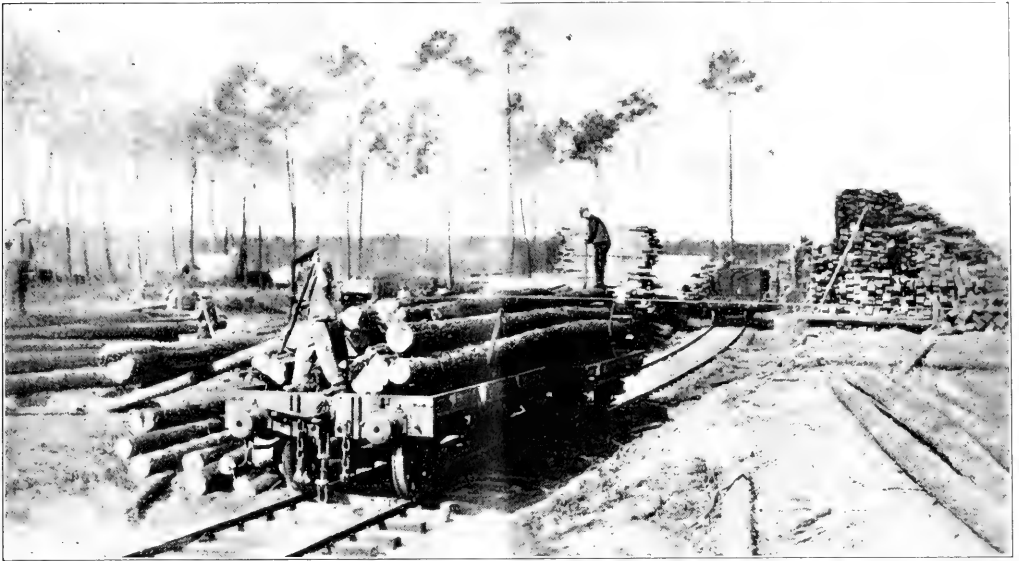
INTERIOR OF AN AMERICAN SAW MILL IN FRANCE, SHOWING ONE OF THE LOG CARRIERS WHICH THE FRENCH CHILDREN NEVER TIRED OF WATCHING

still the prospective timber demands of the ever increasing American Army were not fully assured, and when the armistice brought fighting to an end in November work was well under way in the United States to more than double the number of forestry troops in France, and units amounting to twenty-four thousand men were being organized.

Americans never work so happily and effectively as when they make a game of the job and compete with some one else or some other group doing the same sort of work. This characteristic helped win the war by driving more rivets and building ships faster than such work had been done before; it helped in France building warehouses, unloading vessels and in reducing salient; it was a valuable asset in the forest operations of the Twentieth Engineers (Forestry), which made a remark-

mill at Levier in the Vosges. This mill, which had been overhauled and improved somewhat, cut 163,000 feet in twenty-four hours. The many other good records made by American mills in other parts of France, as well as the many different types of forest encountered and the different methods of operation will make the history of the Twentieth Engineers an exceedingly interesting one.

Before the work of the lumber regiment was well under way in the Landes a few small political clouds appeared momentarily in the sky. Timber was being acquired rapidly, but under the policy that not more than one year's cut would be bought ahead of any single mill; the delay in the arrival of equipment made it look for a time as though the regiment would fall far behind the program; some of the French were skeptical of the abil-



A LARGE LOAD OF MARITIME PINE LOGS ON AN AMERICAN MOTOR TRUCK IN SOUTHWESTERN FRANCE

ity of the mills to cut even as much as the rated capacity. Peasants dependent upon the resin industry were frightened for fear that the Americans would destroy their means of livelihood by cutting too much timber. Timber merchants who hoped to sell timber to the Americans at fabulous prices were having their toes pinched by that effective steam roller—the requisition—which took the timber required at a reasonable price fixed by the French forest officers. Complaints were heard in the French Chamber of Deputies (corresponding to the Congress of

the United States). The officers of the regiment were reminded of the early days of the Forest Service in America, when certain senators and congressmen were accustomed to make the most wild and ridiculous statements in the halls of Congress about the work of the Forest Service. Among the alleged acts of the Americans were the devastating of enormous areas of timber land by unrestricted cutting, the clearing of camp sites by the use of fire which escaped and ran for miles, and other equally indefensible acts. One of the chief mourn-



20th REGIMENT MEN TRANSPORTING LOGS, BY MEANS OF "BIG WHEELS," TO THE BANK OF THE COURANT RIVER, AUREILHAN OPERATION, NEAR PONTENX, LANDES, FRANCE

ers was a timber merchant from Landes. The Minister of Agriculture agreed to send his Inspector General of Forests to look into the troubles.

The Inspector General and a party of French forest officers arrived at Pontenx to visit the American operations. They went over the ground carefully, but found no evidences of ruthless devastation. They found that fire had been carefully controlled, that the methods of cutting the forest followed absolutely those employed by the French. They were much interested in the work of driving the Courant River, and especially in the scheme

camp; the kitchen was reached just in time to see the cook take a big batch of fine brown cookies from the oven; the hot cookies were greatly enjoyed, for such things were then forbidden in French civil life. A loaf of white bread, practically unknown in France for three years, was given to the Inspector General; this was a most acceptable gift and was very pleasantly received. After this visit no more complaints of American methods were heard.

The French sawmills, several of which were leased or bought for American use during the first few months



CANAL AND CAR BRINGING LOGS UP TO THE HOIST INTO THE AURELIAN MILL OF THE 20th ENGINEERS NEAR PONTENX, LANDES, FRANCE

of drying out the trees in advance, for apparently the practice of driving loose logs was unknown in the streams of France. The larger mills were cutting at a rate astonishing to the French, for they were even greatly exceeding the regiment's own expectations. The mechanical ingenuity, the power, and the rapidity with which logs were reduced to lumber was admired by the French. They shrugged their shoulders, however, at the thick circular saws, for it gave them real pain to see so much of their precious wood going into sawdust; a few moments, later, fortunately, their faces brightened when they saw the sawdust automatically fed into the "dutch ovens" as fuel, for the French are accustomed to drive their sawmills by power secured from the valuable slabs and edgings while the sawdust is generally a total loss. A little later the party was shown through one of our

after the regiment reached France, were objects of considerable curiosity to Americans. Although a few of these mills are housed in permanent brick buildings in connection with turpentine stills, the typical mill of the region was a very portable affair readily moved about from one small cutting area to another. Usually the main saw, which is frequently the only saw, is a very thin, narrow band saw; sometimes a thin circular saw is used instead. The short logs, ten feet or less in length, are placed by hand on the light saw carriage; a crank turned by hand feeds the log against the saw. "The lumber is edged on a very small, light carriage, which runs past the opposite side of the band saw from that on which the log is sawn; the board is held down on the edger carriage by a hook at one end and by the hand of the operator at the other. Generally no trimming is

done. One of the mill hands carries the sawdust away in a basket. The mill is operated by a ten or twelve horse power engine. Ordinarily about four people are employed at such a mill, and they produce from two to three thousand feet of lumber per day. Many of the workers are women. In the woods, the logs are usually cut in lengths less than ten feet long to facilitate handling them at the mill and loading them upon the two-wheel carts which haul them to the mill. The logs are peeled in the woods and are given a chance to dry out to some extent; this lightens the logs for handling and also makes sawing easier.

An American notes at once the close utilization of the timber and the large amount of human rather than mechanical labor used in French operations. The very high

which can be worked hard and forced to yield a large daily production; and these were days when a big output was wanted, even at the cost of some raw material.

The first American mill to operate in the Landes was a ten-M mill which started sawing lumber at the Bellevue camp on the last day of 1917. In addition to the head saw, this mill was equipped with edger and trim saws; there was a blower to remove the sawdust. When this mill caught its stride it cut an average of twenty-seven thousand feet of lumber in the two ten-hour shifts. Its record cut was thirty-nine thousand seven hundred feet in one twenty-hour day. One night an accident to the engine stopped the mill; fortunately there was available a French engine with just about enough power to operate the head-saw; this engine was placed at the end of the



MARITIME PINE LOGS DECKED AT A 20-M AMERICAN MILL IN THE SAND DUNE COUNTRY OF SOUTHWESTERN FRANCE

timber values and the low labor costs account for this situation. Just before the war, the French forest laborer, if a man, received from sixty cents to a dollar twenty cents, depending upon his skill, for ten to eleven hours' work per day; he lived at home and furnished his own food. The rate of pay for women was much lower. During the war a muleteer was locally considered a "veritable millionaire;" he demanded three dollars and a half for a day's work for himself, his team of mules and cart, whereas before he had received only half as much.

The sawmills manufactured in the United States and sent to France for the use of the forest troops were in three standard sizes; the bolter mill for small, short logs had a capacity of five thousand feet of lumber in ten hours; the "ten-M" mill had a rated capacity of ten thousand feet in ten hours; and the "twenty-M" mill was designed to cut twenty thousand feet in a ten hour shift. All of these mills used circular saws, which cut a far heavier saw curf than the French mills; it is characteristic of Americans to use strong, heavy machinery

mill, the belt was run across the log deck to the driving pulley of the head saw, and the mill went merrily on for several days, until the regular engine was repaired, cutting and edging eighteen thousand feet of lumber per day on the head saw. When this mill finally ran out of timber, the orders were to move it to a tract of timber at Sabres, a place twenty-five miles away; it was considered that five days was a reasonable time within which to make the move; but by careful planning and organization, this mill was sawing lumber once more at Sabres forty-seven hours after the sawdust stopped flying at Bellevue.

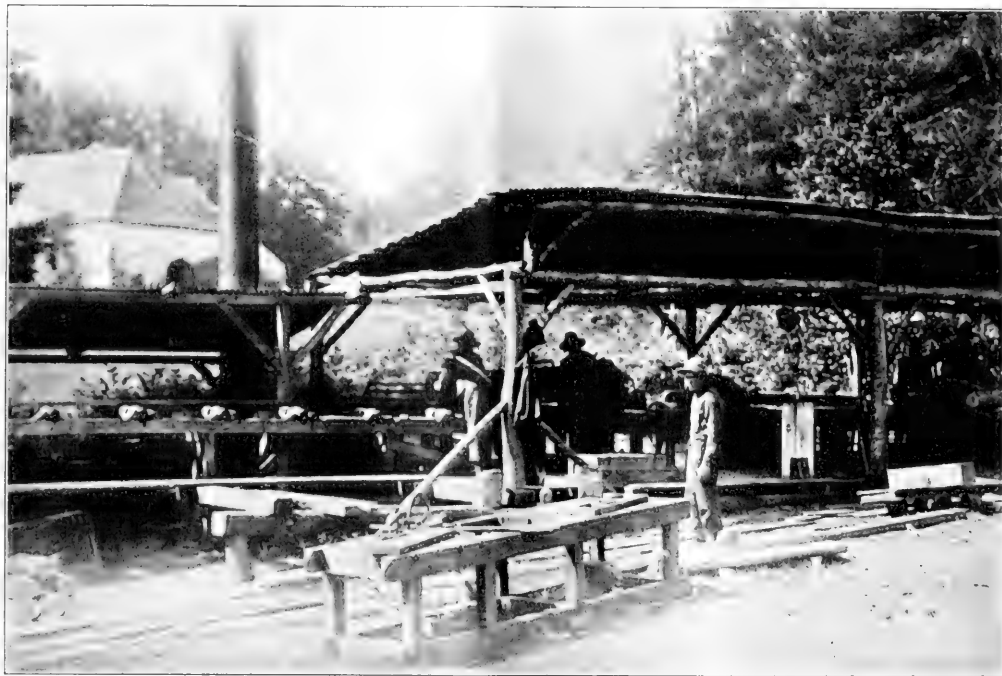
The parts for the twenty-M mills arrived more slowly and it took more time to build them than in the case of the smaller mills. The twenty-M mill at Labroquette, near Pontenx, was the first in its class to operate in France. Two other mills of this size at Bourricos and Aureilhan completed the Pontenx group of mills. April 1, 1918, was the first day upon which all four of the mills of the district operated double shift; on that day

they cut one hundred sixty thousand feet of lumber.

The Aureilhan operation was, on account of the variety of methods involved, perhaps the most interesting of any which Americans conducted in the Landes. The timber tributary to this mill lay partly in the sand dunes near the coast and partly on flat, sandy ground further inland. After the timber was felled and cut into logs, much of it was moved by big wheels, bummers or trucks direct to the Courant River; the more remote dune timber was delivered to a narrow gauge railway, upon which horse-drawn cars transported the logs to the river. The logs were then driven down the river for

Aureilhan Lake is a pretty little sheet of water five or six square miles in area. It was formed only a few generations ago when the sand dunes blocked the river channel. It is said that the ancient village of Aureilhan was buried in the lake. The Aureilhan mill was set near the edge of the lake, and a small canal was dug to bring the logs to the mill during the low water stage. The mill was connected with the French railway system by a spur about a half mile long. Immediately after it was sawed most of the product of the mill was placed in cars for shipment.

The Bourricos mill, to which the logs were delivered



A TIE MILL OF THE 20th ENGINEERS

about four miles, caught in a boom at the point where the river flows into Aureilhan Lake, and towed across the lake to the mill. The maritime pine is so pitchy, sappy and heavy that there was some doubt at first as to whether the logs would float; a few logs tested showed that they would float, but they rode so low in the water that special measures were taken to reduce the weight; several months before the logs were needed at the mill, the trees were felled and left for some time with their branches attached; the leaves continued to function, and so drew much of the water out of the stems of the trees. The stream driving had to be very carefully handled, for with the loose sand bottom and banks there was considerable danger that if jams were formed the water running past would scour out large amounts of sand and form shallows below.

by a narrow gauge logging railway, was set so near the French railway that only a short loading spur was needed. In the case of the Bellevue and Labroquette mills, however, it was necessary to build about four miles of narrow gauge railway to deliver their product at the Pontenx shipping yard, where it was loaded upon the broad gauge cars for final shipment. This narrow gauge line ran along the main street of Pontenx; the villagers no doubt cursed it many times, for it was operated day and night to keep the mill yards clear, and the trainmen took fiendish delight in blowing the whistle of the dinkey locomotive when most people wanted to sleep. At one time for several days, while the locomotive was broken down, motor trucks were used to tow the trains of lumber in from the mills.

During the early stages of the Pontenx operations

there was such difficulty in getting cars in which to ship the product that a considerable amount of storage space seemed necessary; the Pontenx shipping yard was therefore laid out with a capacity of about three million feet of lumber. Although about a million feet did accumulate in the yard soon after the large mills began to operate, a more plentiful supply of main line cars soon reduced the stock. No attempt was made to grade, dry or surface the product; the market was all that an American lumberman could imagine in his rosiest dreams; the army wanted more than could be supplied. The shipments from Pontenx consisted principally of sawn railway ties, road plank, lumber, piling, and fuel wood. In the Pontenx yard, a loading crane was constructed which did effective work in lifting fifteen hundred to two thousand feet of lumber or timber from the narrow gauge direct into the main line cars. The French freight car of standard size holds ten tons, or about five thousand feet of the green maritime pine lumber; this is only about one-fifth of the amount of lumber ordinarily loaded in an American freight car.

At one time while railway cars were still scarce, a fleet of more than one hundred motor trucks was assigned to the work of hauling lumber from the mills in the Landes to a point near Bordeaux; a three-ton truck would do the work of a standard freight car, for whereas the motor truck made a one hundred or a one hundred twenty mile round trip in a day the freight car would take several days to deliver its load near Bordeaux and to return to Pontenx.

The branch line railway upon which the Pontenx and Mimizan groups of operations were located served eight

American mills distributed from eight to thirty miles from its junction with the main line railway through the Landes. The American traffic on the branch line, which grew to seventy or eighty cars of lumber and other forest products per day, soon greatly exceeded the French use of the line. Several rather antiquated locomotives were hired from the French, and American train crews handled the American products as far as the main line junction point.

One of the serious problems of the Pontenx operation was the disposal of the great quantities of slabs and edgings which rapidly accumulated at the mills. In France no one would think of sending such material to be burned on a refuse pile, as is so commonly done in America. The army needed enormous amounts of fuel; the problem was not that of finding a market, but of securing labor to handle the material and cars in which to make shipments. A blast furnace and iron foundry, which had been in operation for one hundred twenty years at Pontenx, was working at capacity to produce shells for the Allied armies. This plant needed a lot of charcoal and wood, much of which it was shipping in by rail for considerable distances. A satisfactory deal was arranged with this company, under the terms of which the Americans obtained a splendid tract of standing timber, and the munitions company received all of the fuel wood in tops and branches remaining from the logging operations, and all of the slabs and edgings not needed for local consumption. The company furnished all of the labor to handle the material, part of which was made into charcoal before it was hauled to the munitions plant.

SCOUTING FOR TIMBER IN THE EASTERN PYRENEES

BY MAJOR R. Y. STUART, 20th ENGINEERS (FORESTRY)

THE general American impression of French forests is that they are like American parks in appearance and that their products are so readily accessible for transportation and utilization as to give value to the smallest twig. This idea is not unfounded since in most parts of France these conditions are representative. One is apt particularly to reach this conclusion if he does not leave the usual course in rail and road travel. But there are parts of the country, devoted to tree growth, which are less accessible and sustained a greater shake up in formation than those more usually seen by the tourist. Units of the 20th Engineers operated in parts of the Vosges, Jura and Central Plateau that brought to their minds vivid memories of overhead skidders and donkey engines employed on their last jobs in the States, methods which permit ready handling of the products and large outputs but not recognized in France as suitable companions for forest protection.

As the demand for timber among the Allies increased it became necessary to investigate the situation in every part of the country regardless of the question of accessibility,

which, it must be conceded, is a relative factor. Lacking boats and other transportation to bring timber to France every available tract became a prospective operating chance. Tracts which previously had been passed up as too inaccessible or difficult to exploit loomed large as possibilities within which to place a mill and crew. Any job that was practicable from an operating standpoint was booked for a coming forestry engagement. Opportunities of their kind were not lacking in that the Americans having been late comers and bearing a reputation for tackling difficult industrial problems brought up for consideration as logging chances tracts which were accumulating surplus growing stock on account of their relative inaccessibility.

It had been determined by preliminary inquiry and investigation that there were some excellent stands of timber in the Pyrenees, the Aude and Tarn, and the Alps regions, but their general location in relation to the points of use made them unattractive so long as the mills and men available could be kept engaged in more accessible operating centers. The rate at which the Americans



QUILLAN, AUDE, IN THE EASTERN PYRENEES. THIS IS A GENERAL VIEW OF THE TOWN AND THE TIMBER DENUDEH HILLS NEAR IT. THERE IS, HOWEVER, A LARGE SUPPLY OF GOOD TIMBER A SHORT DISTANCE FROM THE TOWN.

landed and added to the already large demand for timber in the summer of 1917 necessitated further and more careful consideration of these and other outlying regions as operating points. Accordingly, arrangements were made to scout for prospects throughout all of the Southern Departments. To Captain P. A. Wilson, an experienced British Columbia logger and mill man, and the writer was assigned the mission of covering the Departments adjoining the Mediterranean from Toulouse, east to the Italian line.

The most interesting prospect reported was on the Espezel Plateau, near Quillan, Aude. Captain R. C. Hall had been in that section in the early spring on a preliminary reconnaissance from which it had been determined that the question was not whether the timber was there but rather whether it could be gotten out. Quillan is snugly situated on either bank of the Aude River, a short distance from its entrance into the gorge which it had carved for itself en route to the sea. From the town, surrounded by massive ranges, the timber situation did not look promising, but we were assured by the townsfolk that the prospect lay on the plateau above Quillan.

A climb of 1,500 feet in 7 miles with an average grade of 4 per cent and numerous hairpin turns did not brighten our hopes of making a find. From the edge of the plateau one secured a general view of the timber possibilities. Bounding the Espezel Valley were extensive ranges well timbered and apparently directly accessible from the valley floor. Our automobile indicator registered 22 kilometers (14 miles) from Quillan, the nearest railroad point, where we reached the most accessible

range. While the climb to the plateau and the distance to the shipping point continued to loom large in our calculations they were discounted somewhat when we gave attention to the timber itself. Others had also been impressed with the seriousness of the transportation factor for in no other way could one account for the retention of such fine stands in France. On the ranges encircling the plateau were exceptionally fine bodies of fir suitable in size and quality for the various war demands, including large products such as piling and structural timbers, so difficult to secure. We learned from the French foresters that a cut of approximately 194,000 cubic meters (48,500,000 feet B. M.) could be secured from the State Forests in the group in strict conformance with the customary French cutting methods. This cut represents roughly the yield from these forests for four years. To an American forester in Army khaki visiting them after the spring drive of the Boche it appeared that a cut of twice the amount estimated would leave the forests well prepared to supply timber against the needs from future Boche onslaughts.

The trees were well cleared and symmetrical, ranging from 12 to 36 inches in diameter, from 100 to 300 years in age, and from 80 to 125 feet in height. We observed some areas which would cut 60,000 feet B. M. to the acre. One veteran of at least 48 inches in diameter and 135 feet in height was gaudily marked with a wide band of red paint, a mark of respect to his age and size. The Forest Brigadier expected all visitors in the region to go and see it. Some fungus and unutilized windfall, which are uncommon in French forests, were observed. Logging conditions were variable, the surface varying from

gentle and rock-free to boulder strewn and, in cases, precipitous slopes. As a whole it was, as Captain Wilson expressed it "*Some logging chance.*"

We were convinced that the timber was there but the question of how to get it out was unanswered. That this could be done, and profitably, was evidenced by the fact that Spanish civilian contractors were hauling out four cubic meter (1,000 feet B. M.) loads of logs per trip to Quillan, from 20 to 35 kilometers (13 to 22 miles) distant, at from 25 to 35 francs per cubic meter. An average of two trips in three days was made, giving a return of approximately \$28 per M feet B. M., or \$19 a day. A pair of stout oxen, a heavy two-wheeled French

the logs from stump to mill. A railroad was dismissed because of the heavy and expensive rock work entailed in reaching the plateau with consequent extended period of time for completion. The established road bed was too narrow and tortuous to permit a narrow gauge installation. There was no favorable location for an incline, such an artificial arrangement not having been provided for by nature in forming the topography. A cable, well installed, would work to advantage if cable were available, but cable was as scarce in France as bon-bons. So it narrowed down to a horse job for the woods and motor trucks for the haul to the railroad point, with the oxen and two-wheeled carts as a reserve. The disappointment of the writer is



SO NARROW IS THE GORGE THROUGH WHICH FLOWS THE RIVER AUDE, NEAR QUILLAN, IN THE EASTERN PYRENEES, THAT THE ROAD HAD TO BE TUNNELLED THROUGH THE ROCK

cart and plenty of "vin rouge" in a goat skin sack constituted the transportation equipment. At first blush the method seemed antiquated and inefficient but after observing the manœuvring of animals and loads through and over almost impassable places for stock one was forced to the Ford conclusion that "it takes you there and gets you back." My belief was that, all factors, including cutting restrictions, considered, a copious supply of oxen, two wheeled carts, "vin rouge" and select Spanish woods-phrases would be the most economical transportation method for the operation.

The American mind naturally turns to machinery to assist in meeting engineering problems and the examiners in this instance were not exceptions. Railroad, incline and cable were all considered as a means of transporting

that he could not have seen the competition which would have ensued between the Spanish and American contestants for the road and capacity loads.

The next prospect for investigation was some fir timber on the State Forests of Hares and Carcanet, about 20 miles above Axat on the Aude River. One follows the gorge previously mentioned in reaching these forests from Quillan and is more impressed with the attractiveness of the country to the tourist in search of rushing streams and precipitous slopes than to the timberman in search of a mill prospect. Our earlier experience, however, had taught us to reserve our decision until we were actually within the forest.

The Hares and Carcanet were not so desirable as the forests in the Quillan group, but to those in need of

timber they offered the opportunity of securing excellent material. The French foresters estimated that under their customary methods of marking for the type a cut of 86,000 M³ (34,000,000 feet, B. M.) would be secured, representing in this instance a cut of 90 M³ per hectare (9,000 feet, B. M., per acre). The average tree approximated 20 inches in diameter and 70 feet in height, and of lower quality than at Quillan. Defect was more noticeable. The surface was exceedingly rough and uniformly steep, which, with a lack of substantial forest roads, made the forests very questionable for operating except under war conditions. Some patient and thrifty Frenchmen were engaged in hauling logs from the vicini-

growth. If his offer was in good faith he merits the sympathy of his countrymen; if made in bad faith he has since learned that the buying of timber by the A. E. F. was not wholly a paper transaction.

We learned of a tract of mountain pine near Mont Louis, Pyrenees Orientals, reported to contain from 80,000 M³ to 100,000 M³. Our trip to the tract from Axat was not without interest in that we picked up two French gendarmes en route to the nearest telephone, 12 miles, to report the escape of two Boche prisoners, who, presumably with a Spanish confederate, were headed for the border. It may be remarked that even under the favorable chances for concealment in the mountains of



ANOTHER VIEW OF THE TERRITORY AROUND QUILLAN, IN THE EASTERN PYRENEES THE TIMBER IS MOSTLY ON THE HIGH PLATEAU NEAR THE CITY

ity to Axat with oxen, making two trips a week. The plan of operation outlined for the A. E. F. was to skid and haul the logs by carts to the main road where the logs would be loaded on the tractors or trucks for the haul down the canyon to the proposed mill site at Axat.

An amusing, yet provoking, incident in connection with our timber examinations near Axat was an offer for sale of 3,000,000 M³ (750,000,000 feet, B. M.) by an enterprising American who apparently wanted to do his country a bit. His claim of title covered a scope of country worthy of a favored nobleman. Vigorous mountain climbing and the use of field glasses revealed the fact that the only merchantable timber within the area defined was that on the forest of Hares and Carcanet, title to which had passed to the State 20 years ago. The remaining area was mountain tops, gorges and slopes with scrub

that region the odds are strongly against the Boche having escaped the vigilant gendarmes.

The timber department of the French Army (Centre de Bois), had already secured a liberal cession of the mountain pine and were engaged in operating it when we reached there. We were informed of a controversy which had arisen out of the cession, the Commune and the National Forest Service (Department des Eaux et Forêts) disagreeing on the extent to which cutting on the forest, which was Communal, should be permitted. The Commune insisted that the timber be clear cut so that the land could be devoted to agricultural use. The Forest Service was equally insistent upon conservative cutting and the retention of the land for timber production on the ground that the balance between agricultural and timber land in the region should not be disturbed. The

latter, supported by higher authority, won out.

Believing that the Quillan, Hares and Carcanet tracts would afford a sufficient opening for Pacific Coast loggers to establish European reputations and put them in shape to exhaust the further possibilities of the region, we went in search of hardwoods to appease the woods appetite of our Eastern and Southern logging contingents. An offer of some beech and oak from the State forests of Cayroulet, Hautanioul and Ramondens had been received which looked very promising as tie prospects. These forests form the greater part of Montagne Noire on the boundary between the Departments of Aude and Tarn. The old city of Carcassonne with its massive walls and towers is the historic landmark of the region. The "cite"

was to clear cut but the French were unwilling to practice this method further until the results of experiments under way were known. About 10 years ago clean cutting on limited areas had been made and fir planted, on the ground that the value of fir in the region was greater than beech and oak. The plantations were thriving, giving every promise of success.

The stands varied in size considerably under the system of management followed, which provided for periodic fellings whereby succeeding age classes were thinned and developed to maturity serving in turn as a nurse to succeeding stands. The fight against the encroachment of holly was waged by requiring each timber operator to grub out the holly on the area from which he purchased



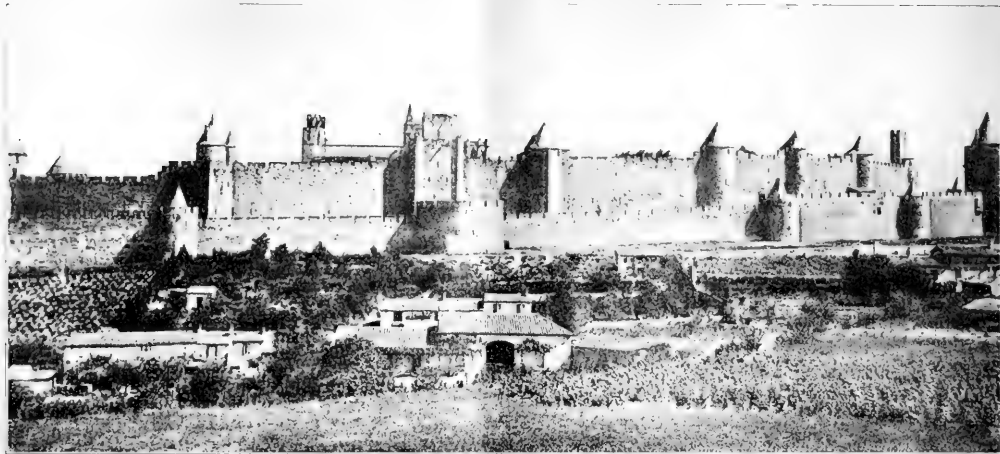
A WILD BOAR (SANGLIER) HUNTING PARTY NEAR QUILLAN, IN THE EASTERN PYRENEES. THE WRITER OF THIS ARTICLE, MAJOR R. Y. STUART, 20th ENGINEERS (FORESTRY) STANDS ON THE EXTREME LEFT

and Montagne Noire attract many tourists in normal times; the former at the time of our visit was a confinement camp for some German officials.

The demand for ties on the part of the Allies seemed insatiable, and for this purpose hardwoods were eagerly sought. Normally one would secure ties, of pine if necessary, from more accessible areas than Montagne Noire, but under pressure of war demand the Montagne Noire prospect looked exceedingly good. Eliminating portions of the forest which presented transportation problems incommensurate with the quantity of timber to be secured a cut of 18,000 M³ (4,500,000 feet, B. M.) was assured under the French system of marking. While a much heavier cut without injury to the forests seemed possible it was explained by the foresters that the encroachment of holly in the openings would follow a more severe cutting. The alternative to secure a heavier cut

the timber. Had the A. E. F. operated on these forests it would have been necessary for it to expend the time of 100 men for 30 days on this work or compensate the French Forest Service 30,000 francs for having the work done. With such care it is small wonder that beech 2 feet in diameter with a clear length of 40 feet and without defect was being produced.

It proved unnecessary to begin operating in any of these regions, the summer drives of the Boche having developed into a boomerang by early fall, terminating in the procurement of a supply of timber to meet the needs of the Army of Occupation from German forests and a freer movement throughout France of material already produced. By December 1, the stage was reached where mills were being dismantled and arrangements made to wind up our timber affairs. Many of the men who, under



THE OLD CITY OF CARCASSONNE, WITH ITS MASSIVE WALLS AND TOWERS, IS THE HISTORIC LANDMARK OF THE REGION NEAR QUILLAN. WHEN THE WRITER WAS THERE IT WAS USED AS A CONFINEMENT CAMP FOR SOME GERMAN OFFICIALS

other circumstances, might be shouting at oxen yoked to two-wheeled carts on the Quillan grade or grubbing holly on the Montagne Noire are seeing the picturesque Pyre-

nees and the historic old city of Carcassonne on leave of absence. It may be that some of them are in citizens clothes in the States.

TRANSPLANTING LARGE TREES

LARGE trees are always transplanted with considerable difficulty and expense, and are far less likely to survive the operation than smaller ones. If trees above three inches in diameter are to be moved, it is best to have the work done by some one who has had experience in transplanting large trees. The most successful results are accomplished by means of a tree-moving machine. Such machines are made by at least two firms in the United States viz., John A. Wilkins, Indianapolis, Indiana, and Isaac Hicks & Son, Westbury, New York. With these machines, trees having a diameter as great as twelve inches can be safely moved.

To those who may wish to attempt the transplanting of trees without engaging the services of an expert, the following suggestions are offered:

In the fall, before the ground freezes, a trench should be dug around the tree which is to be moved, and as deep as the roots have taken hold on the soil, usually three to four feet, leaving a ball of earth from three to seven feet in diameter, depending on the size of the tree and the development of the root system. At the same time a hole should be dug where the tree is to be planted, making it deep enough so that the tree when planted will stand three to four inches below its original level, and large enough to allow the filling in of one to two feet of good rich soil about the roots after the tree is placed in position. To prevent freezing, both the hole and the earth dug from it should be covered with straw.

When the ball of earth has frozen the tree is ready to be moved. The smaller trees may be moved by rolling the ball of earth on a sledge or stone boat, the stem being supported upright to prevent injury to the limbs,

in which position it may be drawn to the place of planting. The ball of earth on larger trees should be raised to the surface by repeatedly leaning the tree to one side and filling in under it with earth on the other. The crown of the tree should then be lowered to the ground and the ball rolled on a long sledge or stone boat by the aid of horses. The trunk should be held free from the ground by means of wooden horses or supports placed on the rear of the conveyance. The limbs should be tied up to prevent injury in transportation. In all these operations plenty of burlap or other material should be used to prevent damage to the bark. Horses may again be used to roll the ball into final position and raise the stem upright.

In all cases the soil should be firmly packed about the roots of the transplanted tree. To prevent their being thrown by the wind, the larger trees should be supported by three or four guy ropes, which should not be removed until the tree has become firmly rooted in its new site.

It is very important that trees transplanted in this way should be watered during periods of drought for the first two or three years, or until the equilibrium between the root and branch systems, disturbed by the transplanting, has been restored.

An experienced tree-mover states that of all our trees, the elms are most likely to survive when moved at a mature age. Other trees which may be more or less successfully transplanted are the maple, horse chestnut, catalpa, ash, linden, willow, poplar, and pin-oak. Trees grown in the open are much better to move than those grown in the woods, and a large young tree is more likely to succeed than an old one of the same size.

CANADIAN FORESTRY CORPS WORK IN FRANCE

BY ROLAND HILL

(Canadian War Correspondent)

OF THE many experiences in quaint places in which the Canadians found themselves doing war duty those of the Canadian Forestry Corps can claim almost prior place. In 1917 Britain, France and Italy were all appealing for lumber—and more lumber. The Allied forces in Salonika were crying for it in the worst kind of way. Russia offered a supply if cutting could be organized. So into the four corners of Allied Europe were sent Canadian timber cruisers, men who had foraged through Northern Quebec, Ontario and British Columbia. Some of them could speak no language but their own, but they knew what they were after, and they could tell to the thousand how many billion feet could be cut from a forest. At one time, after three Ontario men had cruised Crete and Mudros, a Canadian mill outfit was started on its way to the picturesque Mediterranean. But the Royal Engineers decided to do the job and the Canadians were robbed of one of their quaint experiences. Parties were sent to Russia and were about

to start operations when the distant rumbles of the revolution were heard and they were withdrawn.

The best record of the Canadian Forestry Corps, outside that done for the British was the supplying of every class of lumber direct to the French Armies from the Vosges and Jura Mountains on the Swiss border and from the Landes and the Gironde, south of Bordeaux, in sight of the Pyrenees. In the north Canadian uniforms came to be known in the quaint mountain villages, and the peasants opened their homes to the strange men from across the Atlantic. Down in the Landes, where reigned a "dolce far niente" almost Spanish, the vigor and expedition of the Canadian wood choppers was an unceasing marvel. Some of the Canadians from Acadia found distant relations of the same names through Cabot and Cartier in the mountaineers of the Jura.

One day in the early spring of 1917, two Canadian officers chatting with the engineer of the Paris-Switzer-



CANADIAN ROADMEN KEEP THE FOREST TRAFFIC WAYS IN GOOD CONDITION

land express told of the big engines that drove the Canadian Pacific trains over the big grades of the Canadian Rockies. They were critical of the toy French engines. They were invited to take the trip over the border into Pontarlier, the sentinel town of the international border. On they climbed, and when the end of the run was reached, two begrimed, but happy beings climbed off the engine honorary members of the French Railwaymen's Union. One man worked the engine up the winding grades and the other had stoked. One was a professor of Mechanics at McGill University, and the other was chief engineer for one of the biggest lumber companies in Ontario. That was the kind of material of which the Forestry Corps was made.

When the timber famine came along the fighting fronts of Europe, the extreme east of the French lines and fortresses like Belfort were pleading as urgently as the rest. There were huge forests but no material or men to cut them fast enough for military needs. Heavy timber meant the saving of Frenchmen's lives, so a bargain was struck that treble the amount cut and delivered by the Canadians in the Vosges and Jura, for the French armies would be delivered in standing timber near the British lines. In two weeks boilers and mills from the far away Dominion were installed in the mountains. The railway officials were their friends, and loading sidings were blasted out of the solid rock cuttings through the mountains. The peasants, who formerly cut the big trees, used to slowly bring them down the mountain roads by ox teams into the valley town where there were ancient mills driven by water wheels. Ten trees a day was a good average for the mill to saw.

Then the Canadians came on the scene. There were many engineering difficulties to overcome. The supply of water for the big Nova Scotia boilers was solved by their own men and miles of piping were laid that defied gravity by artful pumping. Light railways were built through the forests and mud roads were macadamized by mountain rock which was crushed by our own outfits. In the various mills at the end of the war the output of all sizes of timber had reached 400,000 feet daily, more than the whole Jura produced in the year before hostilities broke out. Fifteen or twenty mills of Canadian type

were distributed at strategic points—anyone coming on the scene might have thought themselves to be in Northern Ontario, or British Columbia. The clever engineers of the Forestry Corps were always willing to help the villagers. They showed them how to harness the rushing streams that irrigated the vine-clad slopes, and turn them into power for electric light or to run their wine presses. One Canadian major who had been in the wooden pipe business on the Pacific Coast gave up his trade secrets in the fraternity of war-time, and water systems were started in villages that for centuries had dipped buckets in the communal stream.

In the south of France the huge pine forests which Napoleon planted for the peasants yield them fortunes

in resin and turpentine. It is estimated that the value extracted from each tree per year is five francs. But in forty years the tree goes sterile, and there were millions of these trees ready to be cut into railway sleepers, and inch planks badly needed for the war. The French Government had difficulty in buying them from the unsophisticated peasants. A government official went with a Bank of France cheque to close a deal with one old forester near the Spanish border. It was for a quarter of a million francs, and a fortune for the old man. He tore the cheque up as worthless; he could only think in tree values, not in coinage. For several weeks the deal hung fire, and then he exchanged the sterile forest for a productive one fifty miles away, asking as his profit one hundred extra

trees. The rapidity with which the Canadians cut the forest amazed the Frenchmen, who called them the "madmen of Canada." They were all good friends, though, and hundreds of the poor folks who had never had the services of a doctor or been in the hospital were treated free by the kindly surgeons attached to the corps. As in the Vosges and Jura, the Canadians who worked in the Landes and Gironde also left the mark of the new world when peace called them back to Canada. The hospitals remain and funds have been raised for a French staff to keep them going. New railroads built by the men from overseas link up hamlets that never thought to see the ribs of steel. It was a quaint experience for the men from overseas, and it was a strange temporary awakening for the people of the Landes.



CABLE RAILWAYS BRING DOWN AN UNENDING SUPPLY OF LOGS IN THE VOSGES

MEMORIAL TREES

THE MEMORIAL TREE, "the tree that looks at God all day and lifts her leafy arms to pray," has become the tribute of the people of the nation to those who offered their lives to their country in the Great War for civilization. In the tree planting the people find opportunity to express their love of him for whom the tree is planted. But the planting is not confined to doing honor to war heroes. Indeed the reports to the American Forestry Association show the people have seized upon tree planting as the finest way to mark centennials, important events in church history, the date of town foundings and similar events. The United States government has just placed its approval on memorial tree planting with the announcement that Memorial Trees will be planted in West Potomac Park near the famous Lincoln Memorial in Washington. The American Forestry Association made the suggestion for planting of memorial trees the day the armistice was signed and since that time tree planting has been taken up all over the country.

To the Christian Endeavor Societies of the World the Rev. Francis E. Clark has sent a call for memorial tree planting, not alone in honor of war heroes, although thousands of churches are planting trees in honor of members of congregations who offered their lives to their country when the call came, but in honor of famous pastors, leaders in church work and to mark important dates in a congregation's achievements. This call has resulted in giving tree planting a great impetus not only all over the United States but all over the world. In the schools and colleges of the country tree planting has been taken up as the means for keeping green the memory of graduates in war work. Georgetown University, at its 130th Commencement, planted 54 Lombardy poplars, one for each of her sons who gave his life to his country. These trees are marked with the bronze markers designed by the American Forestry Association. The National Farm School near Philadelphia has consecrated a "Patriotic Grove" in which are planted trees for her war heroes, friends of the school, and "Festive Trees" marking dates of births, confirmations, betrothals and wedding anniversaries. This form of tree planting will doubtless spread for it is easily seen what a tree will mean to a man or woman if it was planted to mark their birth. It is the same idea that is prompting many college classes to plant memorial trees when entering or leaving a school.

One of the most pretentious plans undertaken in tree planting was at the U.S.A. Balloon School at Fort Omaha, Colorado. Col. Jacob W. S. Wuest has directed the plant-

ing of about six thousand trees. Of this number nearly one thousand are in memory of men who passed through that camp and the one at Fort Crook, and died in the service. The unique feature about this is that the planting was done with the proceeds of "The Gas Bag," the official publication of the balloon school. The next of kin are marking the trees with the bronze marker of the American Forestry Association and registering the trees on the Association's national honor roll. The first chapter of the Daughters of the American Revolution to plant a memorial tree is the "Our Flag" Chapter of the District of Columbia. The tree was planted at the home of Mrs. Laura C. O'Hare. The League of American Pen Women was the first woman's organization to plant a tree in the District. This was planted at the home of Mrs. George Combs.

In Golden Gate Park, San Francisco, a "Hero Grove" has been planted in honor of the California heroes of the war and at Camp Kearny, near San Diego, the Coloradans of San Diego are planning to plant memorial trees in honor of the Colorado soldiers who passed through that camp. In the planting of trees to mark an important date, the Memorial Tree at Camden, New Jersey, is perhaps the most interesting. The tree was planted to mark the 100th birthday anniversary of Walt Whitman, the "good gray poet," by the Whitman Park Improvement Association. But tree planting has spread around the world. The Ardlethan public school in New South Wales has planted memorial trees in memory of each Ardlethan soldier and in Queensland 30,000 trees have been planted in Anzac Park. Of this number 16,000 are for men who gave their lives at the call of the Mother Country.

Another phase of tree planting with great possibilities is the planting of trees along the motor highways of the United States. Make these highways "Roads of Remembrance," says Charles Lathrop Pack, president of the American Forestry Association, who has issued a call to every county to co-operate with the road builders. This "Roads of Remembrance" idea is being furthered in Great Britain by an organization of which Millicent H. Morrison is the secretary. The United States Army Motor Transport Corps now has a motor train crossing the country from Washington to San Francisco. Millions of dollars have been voted for good roads.

With this in mind and the Army demonstration underway thousands of people are expected to urge beautifying these roads by the planting of memorial trees.



This bronze marker for Memorial Trees may be obtained from the American Forestry Association. It costs \$1.00. Send the name and regiment of the man for whom the marker is desired.

MEMORIAL TREES ARE BEING PLANTED BY



Whitman Park Improvement Association plants a Memorial Tree in honor of Walt Whitman at Camden, N. J., to mark the centennial of the poet's birth.
Photo: Public Ledger



In Geddes Park, Bronx, an 800 ft. tree planted by the Geddes Park Association.



Photo by J. P. Curke
Agricultural Classes of Fremont O., High School planting Memorial Trees



At Gorham, N. H., 1000 Memorial Trees were planted from a parade



Photo: Kinale
Boy Scouts of Trenton, N. J., plant 30 trees in honor of Theodore Roosevelt

COLLEGES, MUNICIPALITIES AND INDIVIDUALS



Photo Harrold Ewing
Georgetown University plants 54 Lombardy Poplars in memory of her sons who gave their lives to their country. The trees were marked by the American Forestry Association and registered on its national honor roll.

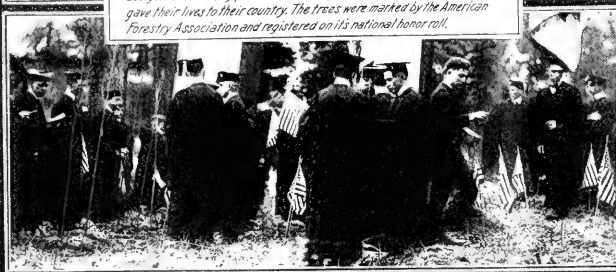


Photo San Francisco Chronicle
Planting the first pine tree in "Hero Grove" Golden Gate Park, San Francisco, and firing salute over Obelisk when "Hero Grove" was planted. The Obelisk had been buried beneath wreaths of remembrance sent by mothers and widows of California's heroes.



NATIONAL HONOR ROLL MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

Cordele, Georgia—John L. Gunn and J. B. Ryals, by United Daughters of the Confederacy.

Washington, District of Columbia—Soldiers and Sailors, by "Our Flag" Chapter, D. A. R.

Godfrey, Illinois—Ovid Radcliffe, by Summerfield School.

Sterling, Illinois—Merrill Benson, Harry Heisman, Byron Lancaster.

White Hall, Illinois—Francis Grimes, by White Hall Senior High School—John Moore, by Junior High School—H. D. McCracken, by White Hall Schools—James M. Lyons, by White Hall Music Club.

Collamer, Indiana—Boys of Collamer, by the school.

Huntington, Indiana—Carl Grossman, Harry Satterwaite, Graham Scott, Elizie Erehart, Earnest Slocum, Alden L. Haller, Charles Beard, Charles Whitelock, Robert Mayne, Carl Timmer, Charles A. Smith, Hugo Taylor, Edward D. Hoover, James Sheller, Floyd Stuart, Garland Robbins, Elmer Fyson, Edward Hasty, by the Women's Civic Improvement League.

Skowhegan, Maine—Twenty-sixth Division, by Reformatory for Women.

New Bedford, Massachusetts—Theodore Roosevelt, by New Bedford and Fairhaven Council of the Boy Scouts of America.

Waltham, Massachusetts—Charles C. Bacon, by First Parish Church.

Detroit, Michigan—Lieut. Col. G. B. Walbridge, Major Edwin Denby, Major John H. DeVisser, Capt. E. C. Barkley, Major Geo. C. King, Major W. C. Cole, Capt. Wm. Lawrence, Lieut. C. F. Clarke, Lieut. A. A. Leonard, Sergt. Jos. Durand, Jr., F. J. Campbell, A. A. MacDiarmid, A. N. McFayden, F. J. Robinson, S. W. Wirts, Irvin Long, T. G. Phillips, and A. G. Pittelow, by Detroit Rotary Club.

Tipton, Michigan—Paul Gilbert and C. L. Bailey, by Spring Brook Lodge, K. of P.

Gorham, New Hampshire—E. J. Bourasse, J. A. Guerin, N. P. Castonguay, Ernest Dupont, G. H. Wentworth, C. W. McGown, O. C. Reid, and W. S. Holmes, by Gorham Women's Club.

Belleville, New Jersey—Michael A. Flynn, Thomas J. Mooney, Michael J. Murry, Harry C. Hoag, Charles A. Schaffer, Harry Blekiski, Fred W. Stockham, Charles McGinty, by St. Peter's Parochial School—W. S. C.

Bain, Jr., and H. M. Garside, by High School—Theodore Roosevelt, by School No. 5—George Eyre, George S. Smith, by School No. 1.

Elizabeth, New Jersey—Former Pupils of William Penn School, by William Penn School—Theodore Roosevelt, by Public School No. 12—Michael Gagliardo, Edward Corris, Benjamin Brower, by Public School No. 6—Former Pupils, by Philip Carteret School.

Hackensack, New Jersey—Albert A. Kleiber, by First Baptist Church.

Harrison, New Jersey—Charles E. Shanaburg, Donald Pegg, Thos. Krotik, Frank Policastro, Howard Quinn, Oscar Grell, by Edison Lamp Works.

Cohoes, New York—Peter Charles Allery, William J. Burns, John J. Blanchette, John R. Bickley, Alphonse Briere, Charles F. Cunningham, Eugene Clements, Anthony Curro, John B. Durocher, Timothy F. Fennen, Sebastiano Guglielmo, Joseph Gadoua, Grover C. Jackson, Harold W. Jewett, John Johnston, Ernest A. Jewett, John Jamieson, Thomas A. Jones, George A. Kelley, John A. Kilfoyle, George B. Lambert, James J. B. Lighthall, Patrick Moleksy, Thomas F. Manley, Frank E. Plumley, Edward Pilawski, Arthur Palin, Charles R. Rowan, Joseph A. Ryan, William J. Rafferty, Edward T. Ruane, William J. Rocheleau, James B. Soden, Arthur V. Soden, Thomas C. Surprise, George Turcotte, Clarence Van Wagner, Walter F. Van Derker, Charles Edward White, Raymond P. White, Dr. Clarence H. White, Robert Manogue, Edward Julian, George Burke, Leo M. Karanaugh, by Woman's Municipal Welfare League.

Delhi, New York—Eric S. Dumbell, by H. M. Dumbell.

Reading Center, New York—Foster F. Jessop, Leon C. Smith, by Study Club.

Ashtabula, Ohio—Harry Kochenderfer, John Green, Homer Dye, Casper Robert Keeney, and Fred Niles, by Ashtabula High School.

Canton, Ohio—Earl Dister Dobbryn, by the East Canton School.

Cincinnati, Ohio—General Foch, General Pershing, Joffre, Tim Willie, William Kluber, Field Marshall Haig, Edward Rickenbacher, Edward Roseler, Admiral Sims, E. McFarland, "Our Dead," "Heroes of Italy," King Albert, Woodrow Wilson, Ralph Wilkerson, Isador Dube, George Hedge, John Jentz, Quentin Roosevelt, William H. Taft, "Old Tiger," Gen. Peyton C. March,

Theodore Roosevelt, by the Opportunity Farm School—William Carter and Carl Koblinsky, by Mt. Airy School—Walter Hawk, William Bailey Gentry, by the Mt. Lookout Business Men's Club—Jacob Waechter, Alvin F. Zorb, F. A. Benzinger, W. H. Sohn, and Herman Koenig, by Vine School—Albert Bauer, Robert Baum, Edward Sauer, William Strietelmeyer, William Ritter, Chester Price, William Painer, William Bierhorst, William Wagner, by Washington School—Walter Volkert, William Nippert, Theodore Roosevelt, by Winton Place School.

Goshen, Ohio—Louis Griffith, Edgar Cole, Guy Felter, Lewis Irwin, Floyd Waite, Clayton Fox, by Goshen Centralized School.

Marion, Ohio—Mrs. Mary A. Ruehrmund, Frederick Herman Harzer, Miss Elizabeth S. Ruehrmund, Mrs. Renata Ruehrmund Hinds, by Clara Ruehrmund.

Berwyn, Pennsylvania—Lieut. Thomas L. Bolster, by Mrs. Thomas L. Bolster.

Boalsburg, Pennsylvania—Alfred Calvin Witmer, by I. O. O. F.—William F. Taylor, by the Red Cross—Guyer Eugene Durst, by the Civic Club.

Huntington, Pennsylvania—Corp. F. D. McEwen, Oscar P. Beck, Frank Palmer Horrmmon, William Lister, William P. Spyks, Robert Bruce Houstine, W. Preston Kurtz, Howard Wise, Clair L. Hicks, Joseph F. Robison, Clarence E. Focht, Antonio Mardelli, by Ladies' Civic Club.

Middleburg, Pennsylvania—Joseph Covert, Jackson U. Fessler, John H. Gundrum, William D. Hackenburg, John A. Hartman, William J. Hartman, Corp. E. H. Hotenstein, Samuel O. Lauver, Erman E. Lepley, Corp. John H. Miller, Roy A. Musser, Corp. George L. Mulliner, Walter Page, Lieut. Wendell J. Phillips, Miles A. Renninger, Samuel M. Rine, Sherman I. Rowe, Sgt. Brewster C. Schoch, Grover Sholl, Hiram C. Steffen, Jr., Lieut. John W. Stepp, Ernest E. Stine, Ralph C. Spaid, Henry H. Sprenkle, Charles Treaster, Boyd M. Warner, Theodore Roosevelt, by Shambach and Wagenseller.

St. Davids, Pennsylvania—Lieut. Wm. H. Sayen Schultz. One tree each by Emilie Sayen Schultz, Wayne Presbyterian Sunday School, Civic Club on Philadelphia Parkway.

Brownsville, Tennessee—Soldiers and Sailors of Haywood County, by Brownsville Civic League.

Nashville, Tennessee—Lieut. James Simmons Timothy, by Catholic Women—Lieut. John W. Overton, by Robertson Academy.

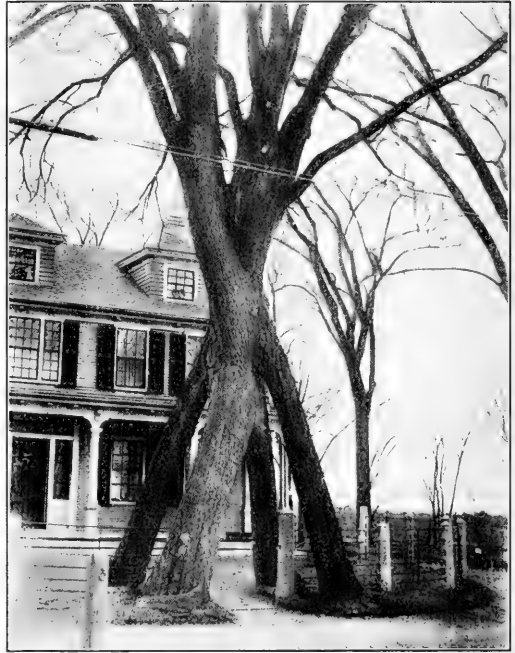
Cherrydale, Virginia—Frederick Wallis Schutt, by Ellen S. Wallis.

Appleton, Wisconsin—William Hageman, August Zuleger, Raymond Neuenfeldt, Raymond Kluess, by Zion Lutheran School.

THE WISHING TREE.

By J. R. Simmons.

This photograph shows the possibilities of the American or white elm as a memorial tree. The man who "constructed" this tree as an entrance to his home was laughed at for his pains, but time has demonstrated that



his faith was not misplaced. He took four sapling elms and planted them in a group, binding them together about twelve or fifteen feet from the ground.

In time the trunks grew together, giving the appearance of a single tree "on stilts." It is known as the "wishing tree," and small boys and girls in the locality believe that by walking in and out among the four legs of the trunk, a wish made in the process will come true.

The tree stands near the state highway in the town of Bridgewater, Massachusetts.

THE OLDEST tree on earth, at least as far as anyone knows, is the Bo tree in the sacred city of Amara-poorah, Burmah. It was planted, the record says, in the year 288 B. C., and is, therefore, about 2200 years old. Its great age is proved by historic documents, says Sir James Emerson, who adds: "To it kings have dedicated their kingdoms in testimony of a belief that it is a branch of the identical fig tree under which Buddah reclined at Uoa, when he was undergoing his apotheosis." Its leaves are carried away by pilgrims as relics, but, as it is too sacred to be touched, even with a knife, they can only be gathered after they have fallen.—New York Commercial Advertiser.

PHOTOGRAPHING FORESTS FROM THE AIR

BY LIEUT. LEWIS, R. A. F.

SO FAR as I know, air photographs have not been used up to the present, for other than war work, and my experience with them has been entirely in that sphere. Such marvelous results were obtained from them during the course of the war, particularly during the latter part, when planes, cameras and operators were more efficient and ground interpreters became more familiar with their work, that I think it is the duty of those of us, who became experienced in their use, to pass that experience on to those in commercial life, who are most likely to find it of value. The timber industry seems to me to be one in which their use has great possibilities.

For about a year of my stay in France, I was employed in the Intelligence Department, and among my duties was the interpretation of aerial photographs and the transferring of information thus gained, to our maps. Of course we already had maps on the country as it was before the war, but the defensive works constructed on both sides

would have necessitated elaborate surveys which, of course, it would have been rather dangerous to attempt in the vicinity of the front line trenches. By experience we learned to know the appearance on a photograph of the numerous defensive works in the enemy lines, trench systems, machine gun emplacements, trench mortar emplacements, gun pits, dug outs, wire entanglements, telephone lines, buried cable lines, and many other constructions became known to us, and the result was that our artillery could deal with these things, and the Canadian artillery have a decidedly efficient way of dealing with things that are bothering their brothers-in-arms, the infantry.

The average height from which these photographs were taken was from 6,000 to 8,000 feet. Now, if such accurate

results could be obtained at these heights how much more could be done with photographs taken, say from 1,500 feet, with nothing to ruffle the nerves of the operators?

I understand that the Government is to establish an aeroplane or hydroplane forest patrol for fire ranging purposes. Why not have these planes fitted with photographic outfits for the purpose of mapping that part of the country of which so little is known? The importance of it to the lumber industry seems to me, although not a lumberman, to be too great to be overlooked. I have found an idea of how this work might be done for the lumber companies.

They might make arrangements with the Government to have their own limits photographed, merely paying rent for the machine while on their work, and the cost of the photographs, approximately \$4.00 per dozen. This would cut out the necessity for having machines, operators, and cameras of their own.

First of all, take the timbered area which carries a

variety of trees, it need only be a small area. Have it accurately cruised, or better still, have a survey made of this one small area and have species of trees given and also condition of ground as to rock, outcropping, etc. Then have this area photographed at two seasons of the year, preferably in the spring, before the leaves come out on the deciduous trees, and then again when they are in full leaf. These photographs will be taken from a known altitude in order to arrive at a scale. Have them carefully analyzed in every detail and records made. They could then be used as standards in analyzing photographs of any tract of timber land, and I am quite sure that an accurate estimate could be made of standing timber, burnt over areas, areas fit for forestation and reforestation and also the water in the vicinity. If photo-



AN INDICATION OF WHAT THE AEROPLANE CAMERA MIGHT DO IN MAPPING THE FORESTS OF CANADA

There is a lamentable lack of forest maps in the Dominion. Some aviators claim they can distinguish tree species by examining stereoscopic photographs and by other methods. This, of course, would be only of general value and the ground cruise would always be necessary. Note the remarkable boldness of outline at 15,000 feet. (A photograph taken on the French front.)



HOW WOODED AREAS ARE DEFINED BY CAMERA FROM 15,000 FEET IN THE AIR

The strips of white and grey in blocks represent cultivated land, the difference in shading being accounted for by various crops, hay, grain, stooked and uncut fields, meadow, etc.

graphs were taken with a stereoscopic camera they could be viewed through a stereoscope and undulations of the

ground which would tell the direction of the flow of streams observed. I should imagine, however, that the map would be sufficient to show this.

If a stated altitude is maintained in taking all the photographs they will naturally be of the same scale and a continuous photographic map of any area can be obtained. Each company could have a natural photograph of its own limits hanging on the wall, could see exactly where logging is going on, and if they wish to do so, could keep track of the progress of the work.

I do not for a moment suggest that photography would be a means of dispensing with cruising in the woods, but I think that it would be of great assistance to cruisers and eventually they will all want to be-

come enthusiastic interpreters of air photographs.—
(From the *Canadian Forestry Journal* of March, 1919.)

UNIVERSITY OF MINNESOTA OFFERS COURSE IN LUMBER USES

LUMBER dealers, manufacturers of timber products contractors and carpenters, who have need of specific instruction in the proper selection of the material used in their industry, will find in the course, "Lumber and Its Uses," offered by the General Extension Division of the University of Minnesota, just what they have been looking for. The course is based upon R. S. Kellogg's text by the same name, and uses as supplementary material a large number of valuable pamphlets issued by lumber associations on grades, sizes, characteristics, etc., of the various woods. It also furnishes a valuable bibliography on such subjects as preservation and seasoning, strength tests, grading and scaling, as well as in the general field.

The kind and grade of wood selected for any use should be the one best adapted to that use, all things considered. The timber dealer must know the qualities of the material he handles well enough to select the best for his own use or that of his customers. If a cheaper timber properly preserved can replace a more costly kind, he should know

it. Timber having been in use so long, it is falsely assumed that dealers know the material well. They do know it in a general way; but it is only in recent years that specific information regarding woods has been sought in laboratory and testing room and given to the public. The matters of wood structures, of tests of strength, durability, preservation and other questions are now being settled in a scientific manner. Results of such tests are included in the correspondence course given by the University of Minnesota.

Many persons are now interested in the use of wood in the manufacture of airplanes either as a matter of general interest or with the idea of becoming inspectors of these woods. It is, of course, impossible to train an inspector in such a short course as this; but much valuable information along this line can be obtained as a sound basis for future work. Only a true understanding of the qualities and peculiarities of wood structure can give an adequate idea of the difficulties encountered in this, or, indeed, in any form of wood manufacture.

**WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE
THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.**

THE USES OF WOOD

WOOD USED IN THE COOPERAGE INDUSTRY

BY HU MAXWELL

Editor's Note:—This is the thirteenth in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

THE cooperage industry includes the manufacture of barrels, kegs, staves, heading, hoops, and other articles made of staves.

The growth or decline of this industry from year to year cannot be conveniently shown, because the government compiles statistics only every five or ten years, and the cooperage associations have never brought figures together except in the most superficial way. It is known, however, that the cooperage industry is fairly stable and does not vary much from year to year. The greatest influence recently has been the prohibition movement which has threatened to lessen the demand for barrels for spirituous liquors. Such barrels constitute a rather small part of the cooperage industry as a whole, and the diminution in the output of whiskey barrels will not greatly lessen the cooperage production in the country. Similar changes have taken place before in the cooperage business, as in the substitution of bags for barrels for cement, sugar, and flour; and pipelines and tankcars in place of barrels in the transportation of oil. In spite of such changes and fluctuations, the cooperage business has moved steadily on. What has been lost in one direction has been made up in another.

There are two kinds of cooperage, commonly distinguished as "tight" and "slack." Tight vessels are intended for liquids; slack for dry articles. Classes and grades come between the two extremes. The barrel that carries alcoholic liquors is considered the highest class of tight cooperage, while the vegetable barrel is typical of

slack containers. The slack barrel end of the business is the larger, judged by quantity of wood required in manufacturing the product; but tight barrels demand a much higher grade of wood. The value of the slack stock used in the country is nearly fifty per cent more than the value of the tight material. Nearly any wood is suitable for some kind of slack cooperage, but only a few are serviceable for tight.

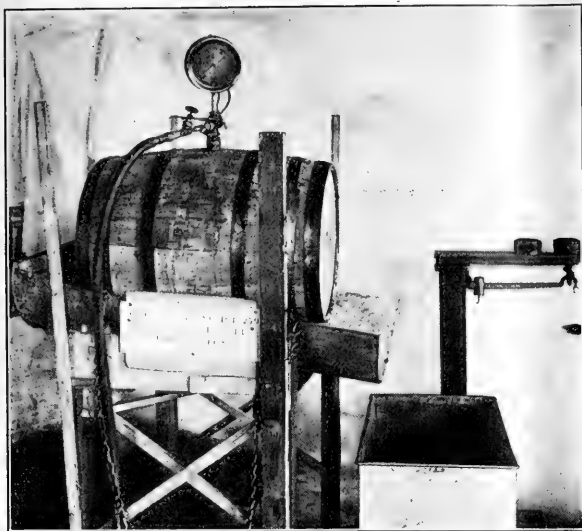
All cooperage whether tight or slack

is made up of three parts, the staves, the heading, and the hoops. No barrel is constructed without all three of these, though certain patterns of veneer drums combine the staves and the hoops in the wooden sheet that forms the body of the vessel. No well defined line of demarcation separates the barrel from the hamper or stave basket, and sometimes it is not easy to say which is which. The manufacturing of the three parts often constitutes three separate industries, a mill or factory confining itself to



A MODERN WINE CELLAR

This wine storage room is underground at the Cresta Blanca Winery, Livermore, California. A peculiar and very high-class of cooperage is used, the heads of the casks being oval instead of circular. The underground tunnel assures an even temperature and contributes to the perfection of the wine. Photograph by courtesy of the California Grape Protective Association, San Francisco.



A LABORATORY BARREL TEST

The pressure is applied within and the amount of it is recorded for future reference. When the force becomes too great for the strength of the wood, the staves are forced apart or they break, or the head gives way, or the hoops may break and the barrel go to smash, which of course puts an end to the test.

one of them alone. The three parts are often brought together by the user who assembles them as the barrels are needed; but not infrequently a single factory turns out finished barrels which are then distributed to the users. The woods for the three parts are not always interchangeable. Heading woods may not be satisfactory for staves; that for staves may be objectionable for heading; while hoop woods are not wanted for heading or staves. Steel is being substituted for wood in cooage, there being steel barrels without a particle of wood; but the most common substitution is wire or strap metal for hoops.

In the year 1909 there were in the United States 1,506 establishments producing slack cooage. They manufactured 2,029,548,000 staves, 140,234,000 sets of heading, and 375,793,000 hoops. Usually sixteen slack staves, two sets of heading, and from four to eight hoops make a barrel, but great variation occurs in different kinds of barrels and kegs. The values in the United States in 1900 were, staves, \$11,477,399; heading, \$6,138,881; hoops, \$2,578,845. The following list shows the woods from which the slack staves were made, and the number made from each:

Red gum, 416,570,000; pine, 306,621,000; beech, 268,237,000; elm, 245,172,000; maple, 133,255,000; chestnut, 93,290,000; birch, 78,807,000; basswood, 72,537,000; spruce, 72,219,000; ash, 71,705,000; oak, 66,675,000; cottonwood, 66,260,000; tamarack, 28,832,000; cypress, 25,673,000; tupelo, 22,500,000; sycamore, 17,831,000; hemlock, 10,376,000; cedar, 9,410,000; yel-

low poplar, 7,851,000; balsam, 6,037,000; Douglas fir, 5,165,000; willow, 3,287,000; all other, 1,128,000; total, 2,029,548,000.

Room exists for considerable choice of wood for staves in slack cooage, but not so much for containers of liquids. Flour barrels were once made principally of cottonwood staves, but elm has proved to be a good substitute. A white wood that presents a clean appearance is wanted, and it must be tough enough and strong enough to carry the load. It must be free from odor or taste that might injure the contents. The sugar barrel demands material of the same kind.

Red gum leads all other woods because it is abundant and satisfactory. The shippers of butter, lard, meat, and other food products select the most suitable woods for their barrels. Custom has much to do with it, but not all; for it is easy to understand that a pine barrel might taint food with the taste of turpentine. The hardwoods are demanded in three times the number for slack barrels as are the softwoods; yet many commodities go to market in softwood barrels and kegs. Scrub pine is used for nail kegs and for containers of other small hardware. Timber which is fit for little else, and poles only a few

inches in diameter, are sawed into staves.

All of the stave woods listed above are likewise used for heading, except cypress; but pine heading is consumed in twice the amount of any other, and beech stands second, with red gum third. The heads of various sizes are cut with special machines. Slabs from sawmills, are cut in rather large quantities into heading, and by combining a slack cooage operation with lumber pro-



HARD BUMPS IN PROSPECT

This test was made at Madison, Wisconsin, by the Government, the purpose being to determine how much tumbling and bumping a filled barrel will stand before it bursts. Barrels get such treatment as this while being loaded and unloaded in the process of transportation by wagons, boats, steam trains and other methods.

duction, better utilization of the wood is secured. The coopers use the waste from the sawmill. Short and defective logs can be worked into staves and heading. Michigan leads all other states in slack cooperage production.

In the production of hoops, Ohio leads all other states, and is followed in the order named by Indiana, Michigan,

Missouri, and Arkansas. Woods suitable for hoops are not so numerous as those for staves and heading. Toughness and strength are essential in hoop woods, for the hoop must bend without breaking. Following is a list of hoop woods and the annual output of hoops from each in the United States:

Elm, 339,477,000; red gum, 9,877,000; pine, 8,321,000; birch 6,051,000; beech, 3,560,000; ash 2,020,000; oak 1,160,000; maple, 731,000; spruce, 106,000; basswood, 30,000; cedar, 5,000.

Though these figures were published under government authority, those purporting to give the production of pine hoops have been

questioned by manufacturers who do not believe that so many pine hoops are made. The unfitness of pine for hoops throws suspicion on the figures.

Two styles of wooden hoops are in use, the coiled and the straight. The coiled hoop is manufactured from logs,

the wood being elm almost exclusively; and the straight hoop may be so made, or it may be shaved from little saplings called hoop poles, each large enough for one or two hoops. If two hoops are made from the pole, it is first split down the center and a hoop is shaved from each half. The making of hoops from hoop poles was one of the earliest wood-using industries of America, and the

history of the business would read like a romance, though it deals with no very startling events. Some of the earliest hoops made in this country bound fish casks in New England, tar barrels in the Carolinas, and tobacco hogsheads in Virginia and Maryland. A number of woods were available for this commodity. In New England the long, pliant whips of white or old field birch (*Betula populifolia*) were the best, and most of them still wore the bark on one side when they went on the barrel or keg. Further south hickory held its ground as a hoop pole wood against all rivals; and very early in Virginia's history a writer sounded the



WHITE FIR KEG FOR SHIPPING GRAPES

This product, both container and contained, is of California origin. The packing for the grapes is redwood sawdust instead of cork dust which is used in Spain in packing grapes for export. Large numbers of fir kegs are required by the shippers of grapes from the Pacific Coast to the eastern states and to foreign countries. Photograph by courtesy of the California Barrel Company.

warning that so many choice young hickories were being made into hoops for tobacco hogsheads, that future hickory forests would suffer. Frequently thirty or forty hoops were used on one hogshead; not all at once, but it was the custom to cut off the hoops and expose the tobacco



CARVED HEAD OF AN OVAL CASK

California wine makers take much pride in their oval casks which are of large size and great strength. The carving on the one here shown is a work of art. It is in the cellar of the Beringer Brothers, St. Helena, California. It was on exhibition at the San Francisco world's fair. Photograph by H. F. Stoll, secretary of the California Grape Protective Association.

to view whenever a prospective buyer appeared, and afterwards replace the staves and put on new hoops.

The hoop pole business was once active in nearly all the eastern and middle western communities, and the name "Hooppole" is carried by more than one county to perpetuate the memory of an early flourishing business



A TYPICAL MOUNTAIN STAVE MILL

Small plants like the one here featured are located near the source of timber supply, and after working up what is in easy reach, move on to another location and there repeat the process. The bolts are usually split in the woods and hauled by teams, or on cheap tramways, to the mill that saws the staves. It is an Arkansas scene.

in this branch of cooperage. A number of woods, besides birch and hickory, are good for hoop poles.

Extensive use is made of barrels and kegs as shipping containers, and in some places they compete with boxes while in others they hold the field to themselves. The life of a barrel is put down at one year by the trade, but that is not enough. A majority of barrels are used many times. They begin as sugar or flour barrels, and are then sold to the farmer for shipping his produce to market. It

may be said that they are returned to him several times, carrying potatoes to the market on the first trip, and tobacco or lettuce on the next, each cargo being lighter in weight than the previous one, owing to the weakened condition of the barrel. Finally the barrel may serve out its life work as a trash receptacle, and in the end can be used for fuel. Thus it may be said that a barrel fills



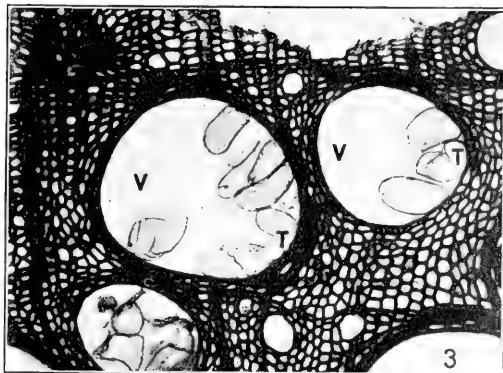
HOUSE MADE OF BARRELS

Empty barrels may serve purposes never meant by the makers. Above is a picture of a human abode constructed of barrels, near Evanston, Illinois. It was occupied by junk dealers as a home during several months, including winter weather when the thermometer fell to 19 below zero. Tarred paper served as a roof and a stove furnished heat.

as useful a career as almost any other manufactured article, and its life is much longer than a season.

The demand for barrels is constantly growing, because modern machinery has made it possible to make them for the trade cheaper than almost any other form of durable package. That it is the most convenient form of package has long been acknowledged.

The heaviest demand comes from the cement business, and flour ranks next, closely followed by sugar and salt.



WHY BARRELS OF WHITE OAK DO NOT LEAK

Alcoholic liquors seep through the staves of most woods but not those of white oak, because its pores are plugged by a growth called tylosis. The above picture is from a highly magnified photograph of this growth in process of plugging white oak pores, preparing the wood for "tight cooperage." The illustration is by Miss Eloise Gerry in the Journal of Agricultural Research.

As containers for fence staples, bolts, nuts, nails, and packages for roasted coffee, spices, crockery, fruits, and vegetables, they follow in the order named. Glass manufacturers, baking powder companies, liquor distillers, and candy, tobacco, and cheese packers are big users of barrels. The demand for barrels for molasses, oil, lard, and pork, is also enormous, while dry paint, glue, snuff, oatmeal, screws, castings, and general hardware articles annually increase the demand on the cooperage supply.

Some woods are waterproof, others are not. Alcoholic liquors and some oils will pass through the pores of some woods where water will not go. The wood of which a whiskey barrel is made may absorb a gallon of whiskey, without any passing through the staves and escaping. Some woods are so porous that barrels made of them will not hold water very long. Coopers learned by experience that certain kinds of wood made better staves than others, when the barrels were intended for liquid. It was wholly a matter of experience at first, but later the microscope helped to explain why some are proof against seepage and others are not. All wood is more or less porous. It is made up of hollow cells, connected one with another by small openings, all microscopic in size; but some of the hardwoods have openings much larger than cells. They are tubes running through the wood, up and down the trunk of the tree, and are called pores or vessels. Some of them, as in oak and ash, are large enough to be seen by the unaided eye, by inspecting the end of a

freshly cut stick. These pores are responsible for the fact that some barrels will not hold liquid. It seeps into the pores and flows along them until it passes entirely through the staves and escapes. That is why wood with large open pores is not suitable for tight barrels.

White oak has always been considered the best tight cooperage wood. Many years ago it was thought that no other could or should be used for certain liquid commodities, but others have lately come into use. Yet, white

oak has large pores, and a casual observer noting that characteristic would conclude that it is not good for tight barrels, but experience shows it to be good. Though it has large pores which may be easily seen, they are not open. They are closed as a bottle is closed with a cork, and liquid cannot enter. The plugging substance, which is known as tylosis, is of a whitish color and is deposited in the pores by the wood itself, in the progress of the tree's growth and maturity. It occurs principally after the sapwood has changed into heartwood.

Red oak's pores are not plugged.

Therefore, red

oak is not suitable for the best kinds of tight cooperage.

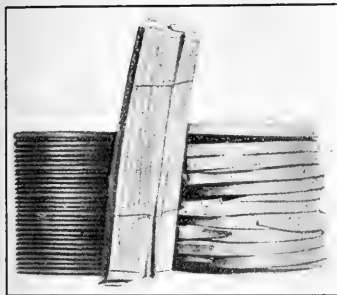
The condition of the pores, whether they are plugged or not, explains why fewer woods are available for tight than for slack cooperage. The following table gives the kinds and the number of tight staves made from each of several woods annually in this country:

White oak, 217,019,000; red oak, 30,619,000; basswood, 30,589,000; gum, 23,566,000; pine, 20,648,000; ash, 5,568,-



GAUGING PRESSURE ON THE BARREL'S SIDE

When barrels are carried in the holds of ships and in barges they are often piled one upon another ten feet high or more. Not infrequently the superincumbent weight breaks the barrels in the lower tier. This test was made to obtain an idea what barrels lying on their sides will bear.



SHOOKS READY FOR SHIPMENT

A barrel consists of three parts, the staves, the heading and the hoops. That is true for all wooden barrels whether they are for dry commodities or for liquids. The bundled material sufficient for one barrel is called a shook. It is much cheaper to ship a shook than the barrel after it has been set up and completed as a barrel.

ooo; all other, 13,250,000; total, 341,250,000.

Only the best wood is used as barrels for alcoholic liquors; but some other woods will do for other kinds

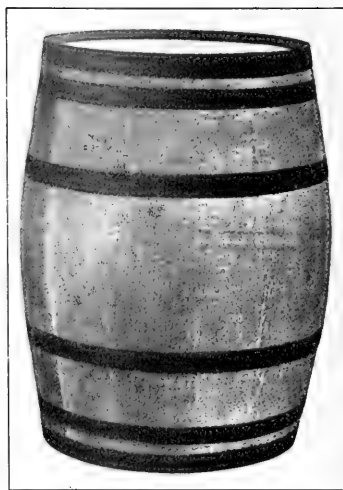
of liquors, such as brine for pork, vinegar for pickles, and for certain oils.

Tight barrels are of several sizes. The strongest, heaviest staves are for beer barrels and kegs. The staves are manufactured by several different processes and are named accordingly, as sawed, hewed, and bucked and split. The tight cooperage industry is well distributed over the country but is more important in some sections than in others, depending largely upon the available supply of suitable timber in the various parts of the country. The leading states in annual production of tight staves are here given:

Arkansas, 87,582,000; Kentucky, 45,694,000; West Virginia, 40,402,000; Mississippi, 39,052,000; Tennessee, 35,744,000; Ohio, 26,534,000; Missouri, 22,420,000.

The waste of wood in the manufacture of tight staves in the past has been very great, but it is not now so great as formerly, because utilization is closer, and material which would have been thrown away formerly is now converted into other products. Much of the finest oak of the country was cut for staves in past years. The makers of this commodity went ahead of lumbermen in new territory, and being first in the oak region, they naturally selected the best oak trees, took the choicest portions of the trunks, and rejected the rest. They made no attempt to use wood which did not split well, and the stave maker's verdict: "It won't rive," was final and consigned the tree to the waste heap. It meant the abandonment of an oak trunk which might contain 3,000 or even 5,000 feet of lumber. That does not often occur now, for a sawmill is usually within reach and what cannot be split for staves can be sawed for lumber, or the logs may be sent to a mill equipped to saw staves or heading.

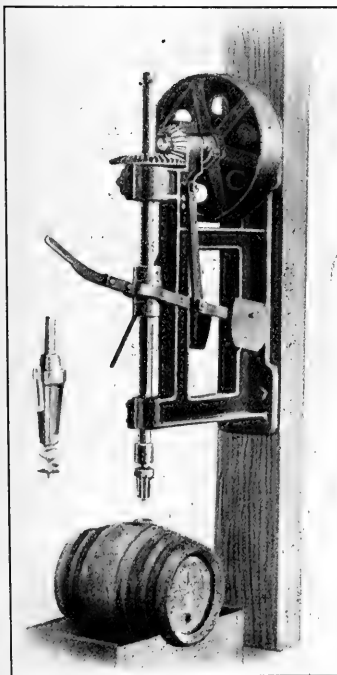
It was once a common situation in forests where stave makers were operating for the ground to be covered with refuse billets and bolts which were left to rot because they



EXAMPLE OF TIGHT COOPERAGE

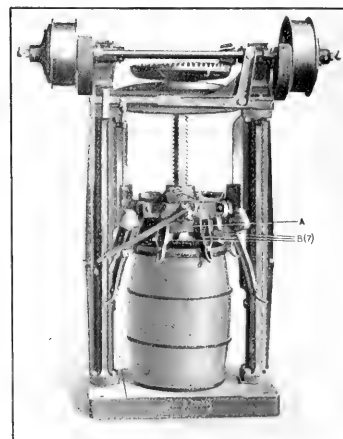
The barrel here shown illustrates the class of cooperage known as tight. The barrels are intended to hold liquids. Not only must the joints be leak-proof, but the wood must not permit seepage through the pores. This barrel is of white oak, which is the highest grade of wood for tight cooperage.

were not just what the operator wanted. The workmen had no compunction when they left on the ground enough oak to make a thousand staves. Good trees were plentiful, and the stave makers turned their backs upon heaps of slightly defective bolts and went to work with their axes to fell other



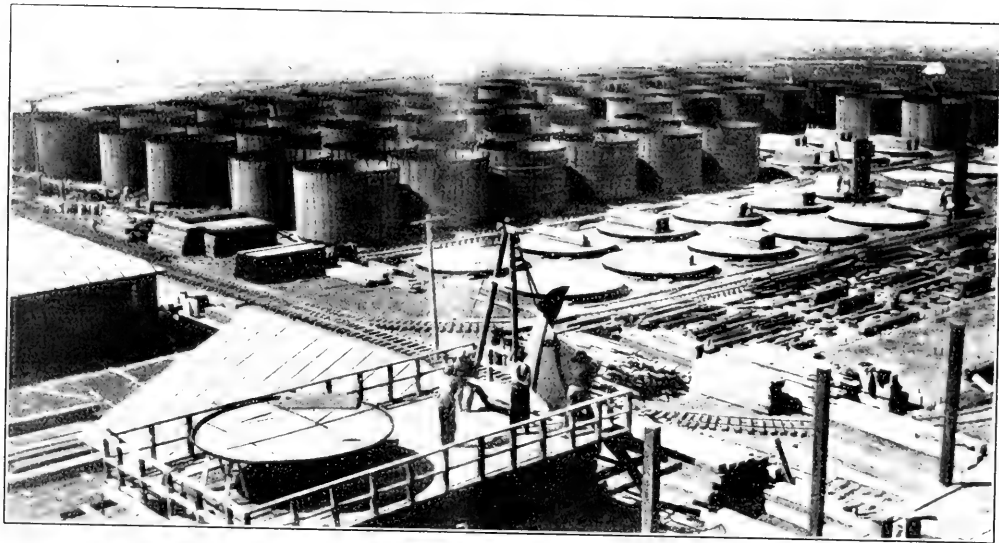
A BUNG BORING-MACHINE

Coopers have machines for nearly everything they do. The boring of bungs is shown in the above picture. The machine is designed to "bore and bush" in the same operation. The boring is a particular piece of work and if it is not done exactly right there will be trouble with leaks later when the barrels are filled with beer. Hand boring is apt to be defective.



A BARREL TRUSSER AT WORK

Machines have been devised and perfected for doing most parts of barrel making. The hand workman formerly did it all, from felling the tree to finishing the barrel, but appliances have been invented which need only to be set in motion and directed by the brain of man, and they will do the rest.



FIFTY-THOUSAND GALLON REDWOOD TANKS

Cooperage of unusual size is here shown. These receptacles are part of the plant of the Hercules Powder Company at San Diego, California. Redwood was employed because of its well known resistance to decay, and the closeness with which its joints may be fitted. The photograph was supplied for this illustration by the California Redwood Association.



BARRELS WHICH HAVE BEEN IN BETTER DAYS AND BETTER DUTY

For the exact locality be pointed out, for the moonshiner must not be disturbed during business hours. The name of the photographer is known, but the camera told an interesting story. It needs no embellishment.



SETTING UP THE SLACK BARREL

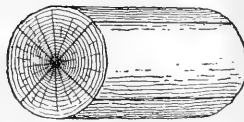
Shooks are often made near the source of the timber, but the barrel is frequently put together and completed near the place where it is to be used. Skilled hands can do the work very rapidly. The illustration shows apple barrels and is from the catalogue of J. D. Hollingshead, Louisville, Kentucky.

trees. Even when the operator had no fault to find with his timber, he usually left twice as much on the ground as waste as he took away as staves. Families living near the stave operations in the forests often secure sufficient waste oak to provide household fuel for years; and most of it was of such high grade stuff that it would have passed inspection by any furniture factory, had it been sawed into lumber instead of being split and slaughtered in the process of stave making.

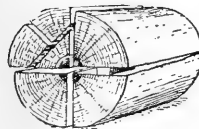
Staves were saleable at good prices at a time and in regions where no market for lumber existed, and for that reason the stave operator was in advance of the lumberman in new country. Little capital was required in making staves when the farmer owned plenty of good oak timber, could buy a crosscut saw for eight dollars, an ax for a dollar, iron wedges for a dollar, a froe for the same, and could make his own maul, mallet, and wooden gluts; and the fork of a log served him for a riving horse. Thus equipped, he was ready for business. He had few labor bills to pay, for

he could do all the work without going outside of his own family for assistance. Some stave making is still done along similar lines, but not much. Oak stumpage now has value, and it is pretty hard to carry on the smallest operation without the investment of some cash capital. Less dependence is placed on hand labor than formerly and more in machinery; and machines are expensive.

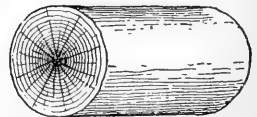
Bungs and faucets are listed as cooperage though they are sometimes considered as belonging to the subdivision of wood-ware which is regarded as a separate industry. The bung closes the opening in the barrel; a spile or spiler is a small plug for closing a vent in a barrel or cask; while a faucet or spigot is a contrivance for drawing



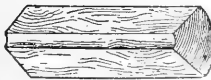
Shows manner of splitting timber into stave bolts where timber is of small diameter.



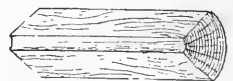
Shows manner of splitting section of timber of large diameter into stave bolts. In making staves, as well as heading bolts, for oil and other tight work, it is ever and always necessary to keep with the grain of wood.



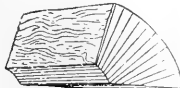
Shows section of log as cut, 3 feet long, for stave bolt.



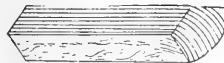
Stave bolt quartered and heart split off.



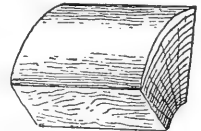
Bolt cut to uniform length on Bolt Equalizer ready for cylinder stave sawing machine.



Shows manner of sawing pieces of heading from Bolt by the Head Sawing Machine. They are cut 1 inch thick upon sap, $\frac{3}{4}$ inch thick at the heart, 24 inches long. Two or three pieces are required to form a complete head.



Shows manner of sawing staves upon a cylinder stave machine.



Shows heading prepared from tree same as in stave bolt.

THE PROCESS OF SPLITTING STAVES

Art, science and experience are necessary in the production of the best split staves. More skill is required to make them with maul, mallet and froe, than with saws. The accompanying series of diagrams is from the catalogue of the Oram Barrel Machinery Company, Cleveland, Ohio.



THE CHINE TEST FOR BARRELS

The lead is not applied squarely on the head or squarely on the side, but on the barrel's chine. Hoops and staves are alike subjected to the strain. This barrel stood about 17,500 pounds. The test was made at the government laboratory at Madison, Wisconsin, and was one of a series on tight barrels.

liquids from a barrel. The manufacture of these small wooden articles requires more than 21,000,000 feet of lumber a year, ninety per cent of which is yellow poplar which is the best bung wood known. It contains no hard and soft streaks, therefore, it may be cut with a smooth surface which insures a close fit without leakage. The wood is dense enough to prevent liquids from seeping through, but it imbibes sufficient moisture to swell the wood, insuring a still closer fit. Walnut and red gum have been used to a limited extent for bungs and are quite satisfactory. Bungs are cut by

machinery from lumber an inch or more in thickness. A larger quantity is made in Cincinnati, Ohio, than in all the rest of the United States combined.

The faucet is seldom sold along with the barrel but is a separate article. It is made in many patterns and of many woods, among them being white pine, spruce, maple, birch, beech, red gum, redwood, chestnut, cedar, walnut, and rosewood. A superstition formerly was to be met with that the wood of which a spigot was made exercised an influence upon the liquid which flowed through it; and for that reason molasses should be drawn through a maple spigot only, beer through one of birch, and cider through one of applewood. The applewood spigot was strongly insisted upon for cider, and it has been currently believed that much applewood is still consumed in the manufacture of faucets for cider barrels. The superstition must have lost its power if it ever had any, for an examination of statistical reports of wood-working does not show the use of a single foot of applewood for faucets in the United States. Sailors along the Atlantic coast in early years insisted upon equipping their water casks with white cedar faucets because of the reputed esoteric purifying qualities of the wood. Fishermen from New England and Canada, who drank spruce beer while on the New Foundland Banks, saw to it that their beer was drawn through no spigot but one made of spruce wood.

Many small articles made of staves are commonly classed as woodenware rather than as cooperage, among such being pails, buckets, keelers, measures, tubs, tool-dishes, and piggins. These have bottoms but no heads. The exact definition is not very important, for cooperage is a term broad enough to include all of them. The making of cedar pails was once a very important occupation in and about Philadelphia, the materials being both the white and the red cedars of that region, and the makers were known as "the cedar coopers."



KEG STAVES OF CHESTNUT WOOD

This photograph represents a scene in Maryland, and is published by the courtesy of F. W. Besley, state forester. The danger of chestnut forests would be speedily destroyed by blight induced many owners of such forests to sell their timber into merchantable commodities as speedily as possible. Chestnut makes excellent small staves.

TUSSOCK MOTH CATERPILLAR CAMPAIGN

BY M. M. BURRIS, CITY FORESTER

DURING the past few years the tussock moth caterpillar has been doing very much damage to the shade trees of Trenton. Conditions were becoming unbearable. There were not sufficient funds to do any spraying on the street trees and so this pest continued its ravages unrelentlessly.

There was but one thing to do—to collect and destroy the egg-masses on the cocoons. We followed the same procedure as in our bird house building contest and enlisted the services of the school children in a campaign

to pick egg-masses, with the hearty co-operation of the Commissioner of Parks Burk, and Miss Ruth Scott, Director of Na-

ture Study in the Public Schools. Through experience in the past, we discovered that prizes form a great incentive to children, and to prove to the children that the citizens of Trenton were actively interested in this campaign, it was decided to have some of the merchants offer prizes. The moving picture houses were first to offer prizes. Eight theatres offered three prizes each; first prize, free admission for a three months' period;

and habits of this pest, the damage done by it and the methods of eradicating it. The children were all interested, and promised to do their bit. The moving picture houses were of great assistance to the cause by showing caterpillar slides, which were prepared by us.

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THE VICTOR AND SOME OF THE SPOILS

Emil Jantz, a pupil of the McClellan School, who ranked highest in the number of individual cocoons collected.

ture Study in the Public Schools.

A meeting was called for January 28, which was attended by every principal and teacher interested in the preservation of our trees. Commissioner Burk and I explained the purpose of the meeting and spoke of the destructive work of the tussock moth caterpillar. Enthusiasm prevailed and the teachers and principals pledged their support to this campaign, which was decided upon to start on February 10.

We visited the various schools and spoke to the children on the tussock moth caterpillar. An excellent set of lantern slides was procured showing the life



HARD AT WORK

Pupils of the Harrison School busily engaged collecting the cocoons. Paper bags were often used as containers.



ROOSTING HIGH

These are some of the boys who worked so enthusiastically and successfully in Trenton's tussock moth caterpillar campaign.

second prize, free admission for a period of two months, and third prize, free admission for a period of one month. In a short time we received 50 offers of prizes, ranging from a ton of coal to a pair of roller skates. Commissioner Burk also offered bronze and silver buttons to the boys and girls picking upwards of 500 cocoons.

The campaign started on February 10 and ended on May 1. During this period of less than three months, the total number of cocoons collected amounted to 2,961,932. The number of children having picked more than 500 cocoons was 421. Emil Jantz, led with 243,529;

Aoner Robinson collected 235,464; Benjamin Palby, 213,550; George Nelson, 190,315; Elmer Manesevitz, 158,500; Joseph Boduar, 126,392; Alex Elias, 100,347.

These figures talk for themselves. The campaign was truly a successful one. The children are interested, and are becoming more and more enthusiastic about trees.

Surely, these youngsters, in years to come, will be educated to the beauty and value of shade trees, and will see to it that the shade trees of this city are not neglected. The *Trenton Times* gave lots of publicity to the campaign and contributed in this way very substantially to its success.

FOREST INVESTIGATION

FOR some time there has been a growing conviction on the part of foresters in the United States that the amount of silvical research conducted by all agencies, including the Federal Government, is very inadequate. The war has emphasized this more than ever.

The southern pine region is still our largest center of lumber production, and the naval stores industry, even though it has materially declined in the last 20 years, is still the world's largest center of naval stores production. The growing area of cut-over land in the South which is not being utilized for agriculture and on which forest production, if there is any, is largely an accident, calls among other things for a much greater effort in forest research than has ever before been possible. Aside from the small amount of work which has been done by the Forest Service on the Florida National Forest and in co-operation with one agricultural station and in general studies, practically nothing has been done. Of fundamental forest research in the southern pineries there has been little or none. The South can be continued as one of our most important timber producing regions, but one basis for this must be a better knowledge of how to practice forestry.

Hardwood production in the United States is centered very largely in the Appalachians and neighboring States. This field has been covered during the past 25 years by a series of investigations which have helped to answer immediate questions, but fundamental problems at the basis of the practice of forestry have hardly been touched. A very large acreage in this region, because of topography and soil, is most suitable for timber production including the woodlot, as well as the larger areas in which can be grown timber for the general market. Practically unlimited markets are immediately at hand and close utilization is possible. The number of species is very large and practically all of them have well-established usages. In this diversified forest many problems of silviculture require solution and some provision should be made for attacking them on an adequate scale.

Similarly in the Lake States comparatively little has been done to lay the foundations for the practice of forestry on the large areas of potential timberland which are now so largely waste. Continued timber production of both softwoods and hardwoods is possible on a large scale, but on the basis of present attempts at forest research the foundation for proper silvicultural methods can not be laid for many years to come.

In New England there is a limited amount of forest research under way by a considerable number of agencies,

no one of which is covering the field adequately. The Federal Government is doing practically nothing. It is probable that a reasonable effort by the Federal Government in this region would serve to round out and stimulate and unify the activities of other agencies so that the forestry problems of the New England States could be solved within a reasonable time. In this region, as we all know, the evolution of lumbering and the gradual drift towards forestry has gone further than anywhere else. We now have probably a better opportunity for the practice of forestry on private lands than in any other part of the United States, barring mandatory provisions.

Even in the West, to which the research activities of the Forest Service have had to be mainly directed during the last 10 or 15 years because of the necessity of information on which to base silvicultural practice in the National Forests, the extent of the work has been far from satisfactory. Within the last five years in order to put the work on a satisfactory basis at fewer places it has been necessary to reduce the work in California very materially, this in spite of the importance of the problems which are pressing for immediate solution. The work in California should again be taken up and in other parts of the West it should be materially enlarged.

There are also other lines of forest investigation which relate equally to all regions, as for example, forest mathematics, a subject which received more or less attention in the Forest Service some years ago but which it has been impossible to cover in any satisfactory way during the last four or five years. Here we have such problems as forest growth and yield, volume tables, scaling problems, and mathematical relationships between height, the diameter, volume, and form of trees, a large and important field on which the efforts of a number of men could be devoted for a number of years with results of the greatest importance to foresters and to the forest industries. There is another group of problems which could well be centered at a forest research laboratory, such as fundamental seed studies and forest biological studies in general.

The time has now come for much closer co-operation in forest research between the Federal Government, the States, the forest schools of high standing, and the State Experiment Stations, with the latter particularly on woodlot problems. Much more can be accomplished by some attempt at unification of effort of reasonable Federal assistance to the States or forest schools on lines of work mutually agreed upon, either in the loan of men or the allotment of funds, or in such other form as may

seem most advisable. Such co-operation should, therefore, be recognized as an essential part of the general program of enlarged forest research in the United States.

It should be recognized that the success of the efforts to secure adequate recognition for this work must depend in a very material degree upon the demand for the work outside of the Federal Forest Service. The present Federal appropriations for silvical research as approved by the House at the short session of Congress is about \$78,000. The Senate Committee added \$25,000 to this amount. It is believed that the general program above outlined could be carried out by an increase of this appropriation to \$200,000, and at the next session of Congress an effort will be made to have this amount appropriated for the work.

PAID IN FULL

THE following is a brief sketch of Captain Homer

Smith Youngs, forestry official and university professor, who gave his life as the salient of St. Mihiel was wrested from the grasp of the Hun: Born in Stillman Valley, Illinois, September 26, 1892. Graduated from Belvidere, Illinois, High School. Enrolled in the University of Idaho School of Forestry, September, 1910, where he won highest honors both as a student and a marksman, and specialized in Forest Engineering and in Grazing. Accepting a position with the Forest Service, District 4, as Chief of Party in charge of primary triangulation, he prepared the base maps for grazing reconnaissance on which he was later engaged for some time. Early in 1916 he was appointed Grazing Examiner for District 1, with headquarters at Missoula, resigning in September of that year to accept a teaching position in forestry at his Alma Mater.

On January 5, 1917, he was married to Anne Geraldine Parker, of Los Angeles, and in the same month he passed the examination for second lieutenant, receiving his Commission April 1. On May 15 he was ordered to the Presidio at San Francisco and was commissioned first lieutenant on June 5. On August 29 he sailed from Hoboken to join the 16th Infantry, which had crossed with General Pershing in July, and first saw active service at the front in November, 1917, where he distinguished himself as a sniper because of his unusually accurate long-range marksmanship. In December he was sent to a British Army Scouting School for further training in methods of scouting and sniping, this training being further supplemented by observation and patrolling in the British trenches at the front. He received his captaincy on January 1, 1918, and on returning to his regiment was made regimental intelligence officer, in which position, he had charge of most of the patrols that went out from his Division—the famous First Division of the First Army. At Picardy he was seriously gassed and in the hospital for six weeks but again joined his regiment on the Champagne front where a shell, which ex-

ploded in a dugout containing three officers, killed the other two and left Captain Youngs unconscious and seriously injured from shell-shock. After two months in Base Hospital No. 8 he again joined his regiment on September 1, and on September 30, in the great battle of St. Mihiel, he went over the top for the last time fighting in the Argonne Forest until October 4, when he received a severe wound in his right shoulder severing nerves which necessitated the amputation of his right arm on October 30. He was never able to bear the strain of



A FOREST HERO OF THE WAR

Capt. Homer Smith Youngs, Co. E, 16th U. S. Infantry.

moving to a base hospital and on November 23 blood-transfusion was resorted to but he died on the morning of November 24, 1918. He now sleeps in Brizeaux Village, just south of the Argonne Forest.

He leaves a young son, Homer Smith Youngs, Jr., whom he had never seen.

Without ostentation, but with dispatch and thoroughness, fearlessly and dauntlessly, his work was done. Those who knew him best loved and trusted him most. He died in the service of his country which he loved so well, and of whose splendid young manhood he was such a perfect type in every sense. His life; his example; his supreme sacrifice, should not be permitted

to fade from the memory of American foresters and all those who enjoy the blessings of liberty and justice vouchsafed by such as he.

His friend and teacher.

C. H. SHATTUCK.

A GARDEN OF THE BRAVE

By Vilda Sauvage Owens, in The New York Times

I sometimes dream that in the years to be,
When France shall rise once more, resplendent, free,
One lovely corner there shall be a grave—
A Garden of the Brave.

And in my dream I see a quiet nook,
That nestles by a silver, running brook.
Brave Belgians sleep within this lovely spot,
'Neath blue forget-me-not.

And close beside, where all is rest and peace,
Acre on acre of the fleur de lis.
Here where the very angels watch are keeping,
The sons of France lie sleeping.

Great masses of the wondrous wattle here,
Where stanch Australians rest. And very near,
A mighty avenue of maple trees,
All gold and crimson, fling with every breeze
A cloud of little winged seeds, that fly
Where brave Canadians lie.

Beneath a coverlet of shamrock rest
Old Ireland's sons, her bravest and her best.
And hark! The music of the pipes! They play
Always where buried Scotchmen sleep, they say.
And purple thistles whisper in the dells
To bonnie heather bells.

Old England's roses here, the white and red,
Where sleep in countless graves her gallant dead.
Here, too, the tiny English daises grow.
The soldiers loved them so!

And further still, a little nook, yet dear,
The friendly sunbeams love to linger here,
Where glowing California poppies nod,
And yellow goldenrod.

I dream that as the years move on apace,
We'll fare as Pilgrims to this hallowed place,
And pause beside each fragrant, flowering glade,
Or rest beneath the leafy maples' shade,
And hold communion there in love divine,
And pray, as at a shrine!

FOREST RESERVE FOR KENTUCKY

THROUGH the gift of the Kentenia-Catron Corporation, which owns thousands of acres in Eastern Kentucky, the State has acquired a forest reserve of 3,400 acres on Pine Mountain, Harlan County. The land is not underlaid with coal and has no agricultural value. It is the first reserve the State has acquired and J. E. Barton, commissioner of forestry and geology, who has been trying for several years to secure such a tract, said that it will afford an excellent opportunity to demonstrate reforestation and the proper method of propagating trees and lumbering.

PLANT MEMORIAL TREES

MORE AIRPLANE PATROLS FOR NATIONAL FORESTS

TWO additional routes in the patrol of national forests by Army airplanes, to give early warnings of fires in the forests, have been arranged by the War Department and the Forest Service, United States Department of Agriculture. The routes will be operated from Mather Field, near Sacramento, and were placed in operation June 1, on the same day as two routes operated from March Field, near Riverside, California.

The first route from Mather Field covers the Northern Eldorado and Tahoe Forests on the valley side of the Sierras. It starts from Mather Field and proceeds to Placerville, Colfax, Nevada City, Strawberry Valley and Oroville, where the planes land at available fields. This route is to be covered in the morning of each day and the return trip made in the afternoon.

The second route from Mather Field covers the Southern Eldorado and Stanislaus Forests. Starting from Mather Field, the route goes to Placerville, Grizzly Flat, Big Trees and to a landing near Sonora or Tuolumne. This route is covered in the morning and return trips made in the afternoon. Both of the Mather Field routes have a round-trip length of about 150 miles.

Forest Service reports tell of a successful trial patrol undertaken recently. No difficulty was experienced in detecting fires in heavy timber at elevations of 6000 to 10,000 feet.



THE ROOSEVELT REDWOOD—FITTING TRIBUTE TO OUR LATE EX-PRESIDENT

A monument that has stood for ages and will stand for ages to come is the giant redwood tree in the Yosemite Valley which bears the name of Roosevelt. A more fitting tribute in memory of our late ex-president can hardly be imagined.

INSECTS IN THEIR RELATION TO FORESTRY

BY DR. R. W. SHUFELDT, F. A. O. U., ETC.,

MEMBER BELGIAN ORDER OF ST. JOHN OF JERUSALEM

(PHOTOGRAPHS BY THE AUTHOR)

FOR the past half century and more, the immense host of insects that are, to a greater or less degree, inimical to our forest, fruit, and shade trees, have been under investigation by entomologists in both public and private life. The indefatigable workers in the various Federal departments at Washington and elsewhere have contributed an enormous literature to this subject, covering every line of research embodied in the science; while the results they have achieved have been of the most incalculable value, not only to the country at large, but to those interested in trees of all kinds anywhere. This is true irrespective as to whether the latter be represented by our most extensive private or governmental forest owners, or by one having but a few trees under his care in any part of the United States, or in neighboring countries, whereon such insects occur.

As stated above, a large part of this literature, referring to the various forest-insect problems, has been published by the Government, and particularly by the Bureau of Entomology of the United States Department of Agriculture, of which Dr. L. O. Howard is the Chief. While a fairly generous supply of these bulletins and other publications are issued, they by no means reach all they should, nor supply the demand for them by those interested in the subject at large. This being the case, any extension of the knowledge of such matters, in any of its departments, should be regarded with favor; and to this end popularization of various phases of the science will, from time to time, be the object of this section of AMERICAN FORESTRY. In this work the bulletins issued by the

Forest Insect Investigations of the Bureau of Entomology, of which Dr. A. D. Hopkins is in charge, have been especially helpful, while in addition to such aid a great many actual observations, extending over many years, have been made by the present contributor in the fields and forests. The observed phenomena thus studied will all be incorporated as the material is worked up and illustrated. Almost without exception the photographs of the matter described have been made from such material; and where certain insects have not been easily obtainable, they have been generously loaned the writer from the duplicate series in the United States National Museum collections. For such courtesies thanks are especially due to Drs. E. A. Schwarz and Harrison Dyar; to Messrs. Carl Heinrich, J. C. Crawford, H. S. Barber, and to others associated with them in the Bureau.

From the various sources of information brought down to us from the earliest time to the present day, certain primary facts have been established. In the first place, the list of insect forms that attack *forest trees* in this country is not an especially long one, when we come to consider the enormous array of species that are entirely innocent with respect to any such charge. Many insects

attack trees that have no claim to be classed as forest trees; while a formidable list of insects commit their depredations upon certain shrubs and plants, and never have anything whatever to do with trees. There are insects that feed only upon the *leaves* of forest and shade trees, causing damage to that extent alone; some of the bark beetles devote their attention to fully grown and



Fig. 1. THE LARVA OR CATERPILLAR OF THE REGAL MOTH (*Citheronia regalis*); NATURAL SIZE, FROM LIFE

This elegant larva of the Regal or Royal Walnut Moth is of an intense green color, with black and white markings. Its curious pairs of "horns" are brilliant scarlet, tipped with black. It is seen here feeding on the leaves of the sycamore tree.

sound trees, while other species do so wholly to dead or dying ones, or to fallen trunks of them in the forests and elsewhere. Then the roots of forest trees also have their special enemies, while others destroy the bark.

In so far as forest trees are concerned, perhaps the most destructive insects are the bark beetles, of which there are quite a large number of species. These beetles have, in times past, utterly destroyed forest trees covering hundreds of square miles, and they are committing the same depredations at the present time. They bore through the bark of pine, spruce, hickory, fir, and other trees—full-grown, healthy trees—and subsequently completely girdle their main trunks, which ultimately kills the tree so preyed upon.

In passing through the vast pine forests of the Southern States, as the writer has frequently done, one may plainly see the fearful devastation wrought by the various invasions of the common pine beetle of the South. Hundreds of square miles of dead pine and spruce trees may be seen in various stages of decay, the death having been caused by this pest. We may even observe the same class of destruction in its various stages in certain areas within the District of Columbia. Great quantities of useful timber have thus been lost to the country and the industries; while we may note similar destructive work in progress, and at all stages, due to the operations of the spruce beetle in the forests of those trees in northeastern United States and southeastern Canada.

"This species," says Doctor Hopkins, "caused the death of a very large percentage of the mature spruce over an area of thousands of square miles. In the aggregate many billions of feet of the best timber were destroyed. The large areas of this dead timber furnished fuel for devastating forest fires, with the result that in most cases there was a total loss."

More particulars on this vitally important subject will be brought out in future issues of AMERICAN FORESTRY, as well as observations on the destruction now in progress in our North American forests due to the attacks of other species of insects and their larvæ in still other regions.

Passing from these few introductory remarks on forest beetles to moths, we enter upon one of the most

attractive fields of inquiry and observation in the entire realm of biology. As in the case of all the biological sciences, it has its large literature, illustrated by thousands upon thousands of plain and exquisitely colored figures; while upon the other hand there is the entire world of nature ever standing open to the investigator for the verification of all that is set forth in that literature, and offering at the same time no end of new material for study and description. All this is equally true of the butterflies—a group so closely allied to the moths that they appear to almost run into each other. Now, in a great many instances, the larvæ of caterpillars

of both moths and butterflies feed upon the leaves of trees of many descriptions, those of our forests as well as the shade trees of our towns and cities. These insects may be studied with a great many objects in view; but this field is so extensive that to enter upon it in any satisfactory manner would result in the presentation of material far exceeding the limitations of the space at our command in the present connection. However, such information will be forthcoming from time to time, while right here it is proposed to briefly introduce one of the very hand-somest moths in our insect fauna. This is the Regal or Royal Walnut moth, *Citheronia regalis* of Fabricius (Figs. 2 and 3). Its caterpillar is a most remarkable looking creature, and it is here shown life-size in Figure 1. A summer or two ago, Mrs. Bert



FIG. 4. ONE OF THE OLDEST BLACK WALNUT TREES IN THE ENVIRONS OF WASHINGTON, AND ONE THAT HAS PROBABLY SEEN FIFTY SUMMERS COME AND GO

Trees succumb from all sorts of causes. Old age has overtaken this one; but it has also been struck by lightning; partly strangled by vines; furnished food for thousands of larvæ, and weathered the gales of half a century.

S. Elliott, of Washington, D. C., was good enough to furnish me with more than a dozen living specimens of this grand larva of our Regal moth, they being transported on a big limb of a sycamore tree, bearing a great quantity of fresh leaves, which latter constitutes one of their foods in nature. In a reproduced photograph, this caterpillar is a rather tame-looking affair as compared with the living animal. To appreciate this, one must indeed see it in life, with its shiny, pea-green body, ornamented on the sides by an interrupted series of black and white markings; its red head and tail-plates; red and black feet, and its remarkable, double pair of curved, red and black horns on the segments just back of the head. Smaller horns, too, are seen elsewhere on the body, as shown in the cut. Country boys call this caterpillar

the "Hickory Horn-devil," and generally destroy it upon discovery. It has an average length of some five and a half inches, and is the largest caterpillar in our insect fauna. It does not spin a cocoon, as many other large caterpillars do; on the other hand, sometime in September, it works its way under ground, there to be

the unconsumed ones removed. After all the larvæ have disappeared under ground, the box may be kept in a dry and moderately warm room until the following summer, when your moths will be forthcoming—and what superb creatures they are upon emergence!

Butterfly larvae, of a great many species, genera, and families, also feed upon the leaves of various trees of the forest, and among them we find not a few representatives of the genus *Papilio*, which is a truly gorgeous assemblage of forms; they may be reared from their chrysalids in the manner recommended in the last paragraph in the case of moths.

A few miles west of Washington, along the old Georgetown Canal, is a great place to meet with the Ajax Swallowtail—a butterfly of extreme beauty (Figures 5 and 6). There is a good reason for finding the insect in

that locality, as in the marshy area between the tow-path and the Potomac flourish many Papaw trees (*Asimina triloba*), and it is upon the leaves of these that the caterpillars of the various forms of this butterfly feed. On one occasion, in this locality, the writer captured three of these lovely butterflies with one sweep

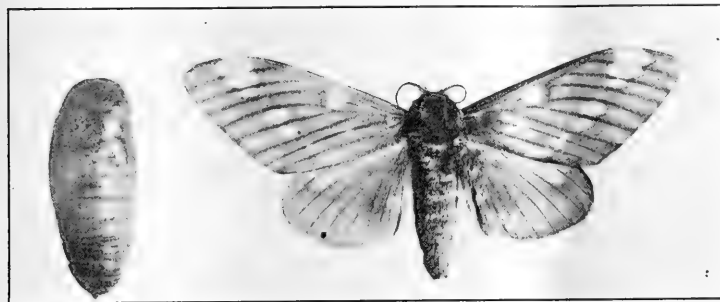


Fig. 2. MALE REGAL MOTH, VIEWED FROM ABOVE. SPECIMEN IN THE COLLECTION OF THE UNITED STATES NATIONAL MUSEUM. THE DARK BROWN PUPA IS SHOWN TO THE LEFT. BOTH REDUCED ABOUT ONE-THIRD.

Here is an instance in the insect world where the male of the species is conspicuously smaller than its mate (see Fig. 3).

transformed into the pupa here shown in Figure 2, from which it emerges during the following July as an elegant orange-red moth, with the dainty white and yellow markings here seen in Figures 2 and 3.

This caterpillar feeds upon the leaves of the butternut, hickory, persimmon, sumach (*Rhus*), sycamore, and walnut trees. Of the last-named we have a victim in Figure 4. This moth is rare in the North and nowhere abundant; while in the State of Georgia it is said to be double-brooded. In this genus *Citheronia* we have at least two more species of these big moths, namely the "Pine-devil moth" (*C. sepulchralis*) and the Mexican Walnut moth (*C. mexicana*). Of the former Doctor Holland says: "It ranges from the Carolinas northward to Massachusetts along the coast. It is not common in the valley of the Potomac; and at Berkeley Springs I have found it abundant in the larval state in the months of July and August."

The third species is found in Arizona and northwestern Mexico. To rear and study this elegant moth—indeed, any of our large moths—one has but to place the larvæ or caterpillars in a large and thoroughly clean pine box containing about a foot or more of soft, dark soil. The top should have a fine wire-mesh cover that can be readily removed. Fresh leaves of the sycamore or other trees mentioned above should be fed to them every day and

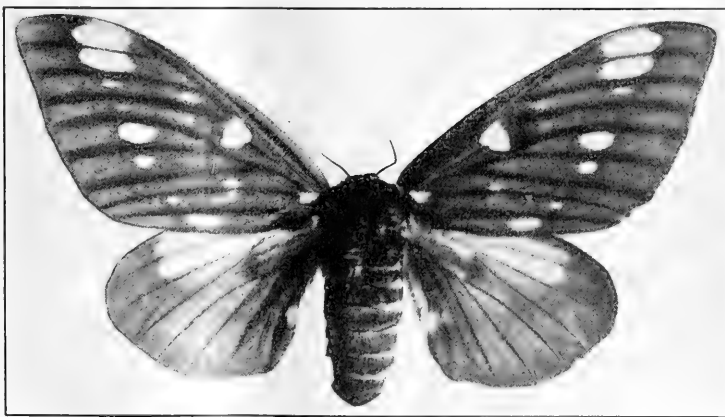


Fig. 3. A PERFECT SPECIMEN OF A FEMALE OF OUR REGAL WALNUT MOTH; NATURAL SIZE, AND VIEWED FROM ABOVE

This well shows how carefully these moths are mounted in our great collection in the National Museum. In coloration, this is a very striking species, hence its name, "Regal."

of the net, as they rested on the mud within a few feet of the Potomac. Upon reversing the net, two were taken and one escaped. Doctor Holland gives us a beautiful colored plate of these zebra butterflies in his "Butterfly Book," upon which five different subspecies of *ajar* are shown, as well as *Papilio eurymeda* of the same group, the one shown in Figure 5 of the present article being

Papilio ajax marcellus—male. *Walshi* is the winter form of *ajax*, the “chrysalids which have been exposed to the cold of the winter” produce it; “the black bands of the wings are narrower and a trifle paler than in the other forms, the tails of the hind wings tipped with white, and the crimson spot on the inner margin near



Fig. 5. FEW BUTTERFLIES IN EASTERN UNITED STATES CAN RIVAL IN BEAUTY THE FAMOUS “SWALLOWTAILS,” AND OF ALL THAT GROUP THERE IS NOT A HANDSOMER SPECIES THAN THE ONE HERE SHOWN, WHICH IS WIDELY KNOWN AS THE “ZEBRA SWALLOWTAIL.”

Butterflies of this zebra kind long puzzled the entomologists, for the reason that they were found to be seasonally polymorphic. The one here shown is the *Ajax*—a most remarkable insect.

the anal angle forming a conspicuous bent bar.” In flight, this butterfly has the appearance of being white, banded with black (as in the cut for the under side), with the wings emarginated with a broad band of black; the red spot is quite conspicuous. It would seem that in certain localities these various types of *Papilio ajax* intergrade, making it a bit difficult sometimes to define and name them with absolute certainty. In any event, as it does a tree no good to have its leaves eaten up by caterpillars, and as the Papaw is a tree of some value along the streams that course through our forest, the caterpillar of this handsome butterfly must be considered in the light of an insect inimical to it.

Speaking of the early stages of the genus *Papilio*, Holland says that “the eggs are somewhat globular, flat-

tened at the base, and smooth. The caterpillars are cylindrical, smooth, fleshy, thicker in the anterior portion of the body than in the posterior portion, and are always provided with osmateria, or protrusive scent-organs, which, when the larva is alarmed, are thrust forth, and emit a musky odor, not highly disagreeable to the human nostrils, but evidently intended to deter other creatures from attacking them. The chrysalids are always attached by a button of silk at the anal extremity, and held in place by a girdle of silk about the middle. The chrysalids are, however, never closely appressed to the surface upon which pupation takes place.”

It is surely very remarkable how the caterpillar can attach the delicate little girdle of silk that goes about its waist, or the “button” at its abdominal extremity, during the transformation performed through pupation. It has not been the writer's fortune to observe this up



Fig. 7. WE HAVE HERE AN ENEMY OF THE BLACK OAK—A BEETLE KNOWN AS THE BROAD-NECKED PRIONUS (*Prionus lat-collis*)

During the first two weeks in July, this big, black *Prionus* emerges at twilight, and may frequently be captured around the street-lights of eastern cities. This is a Washington specimen.

to the present time, notwithstanding the fact that many papilionian larvæ have been kept by him during their transformation to the pupa stage, and, after that, until the butterflies emerge from them. The suspending girdle is invariably adjusted with the greatest care, in the same place, with the head of the pupa above, and the very

firm fastening of the tip of the abdomen below. This, it will be seen, holds the pupa in such a way that the median longitudinal line of its body makes an acute angle with the plane of the surface to which it is attached.

Thus hangs the pupa of a *Papilio*! But why it should apparently be obliged to be suspended in that manner, while the pupa of an *Argynnis*—such as one of our Silver-spots for example—should only be suspended by the end of the abdomen, is surely difficult to explain.

As has already been noted in a previous paragraph, the

larvæ or caterpillars of our moths and butterflies feed upon the leaves of trees; but the beetles, upon the other hand, are far more destructive, for, as a rule, they attack the bark, the true wood within, and the roots. An excellent example of such insects is seen in the Broad-necked *Prionus* (*Prionus laticollis*) of Drury. In Packard's report on Forest Insects we find a cut of this species, with figures showing the larva and pupa, after Riley. The beetle is illustrated in the present article in Figure 7, which is from life. Generally, this insect

is discovered living in the trunks and roots of the trees known as the Balm-of-Gilead and the poplar; but Mr. F. Clarkson found, many years ago, specimens of this borer infesting the Black oak. He reported in the *Canadian Entomologist* (XVI, '95) that "their presence is quickly realized by the odor of the female, which is very powerful, and can readily be detected 20 feet distant. I placed a female, immediately after emergence, in an uncovered jar; and wherever I positioned it, on the piazza or elsewhere, the males were attracted from every direction.

I captured twenty males in a very few minutes. Oak Hill cannot boast of a Balm-of-Gilead or a Lombardy poplar, but it is famous for its oaks; and while it is admitted that the former trees as mentioned by Harris, serve as food for the larvæ, my observations indisputably prove that they feed also upon the roots of the oak."

This beetle is of a blackish brown color, shiny, and exhibits no markings whatever. It is a strong flyer; and when on the ground it gets along with considerable rapidity, especially when not impeded by the vegetation

or the coarse, pebbly character of the ground or soil. Frequently they make their appearance in the streets of our towns and cities at night, apparently attracted by the lights in the streets and windows of our dwellings. This *Prionus* is a hard, strong beetle, requiring a pretty stiff blow to crush it. Its jointed antennæ are of a fair length only, though stout and beautifully jointed with short joints. When at rest, each one exhibits a gentle curve outwards and somewhat backwards. Its eyes are rather large, while one of its most striking char-

acters is the unusual width of its neck, which, upon either outer margin, presents a pair of pointed processes, one in the middle and one occupying the supero-external angle. Its outer wings or elytræ are granulated, and so rather roughish; while mesially, the ultimate segment of the abdomen projects beyond them. Finally, we may say that its three pairs of legs, having the same color as the rest of the insect, are rather stout, but otherwise in due proportion to the size of the insect.



Fig. 6. ONE OF THE LOCKS ON THE GEORGETOWN CANAL IN THE EARLY SPRING OF 1919. A FEW MILES WEST OF WASHINGTON, D. C., AND A FINE LOCALITY FOR COLLECTING

Some of the finest sycamores anywhere are to be found in this region; sometimes they are seen to be double, as in this view.

GATHERING THE SPINULOSE SHIELD FERN

BY FRANK B. TUCKER

THE spinulose shield fern unexpectedly paid for my vacation several years ago. I never thought when I left New York late in August for a three-week vacation in the Green Mountains that I would return to the city with about as much money in my pockets as when I left. But such was the case.

While in no way bound to hide the identity of the place in Vermont where this happy windfall befell me, I do so, lest I give the village—if such it may be called—too great a prominence. It has but two houses that take vacationists. The largest may have accommodations for 40 guests; the smaller for a third this number. The native all-the-year-round population is about fifty.

The hamlet, for such it really is, is delightfully situated in a dilation of a valley of a branch of the Deerfield River, some nineteen hundred feet above sea level, with encircling summits rising another ten hundred feet. Save for the daily trip of a quasi public stage, that hires itself out for passengers, mail, baggage and freight, and an occasional automobilist on a tour of exploration, the place is unlinked to the busy world. And until the advent of the fern industry it contributed no article of commerce to the world.

About ten years ago a shrewd eyed native of the locality saw a fortune in the perennial crop of the spinulose shield fern that for countless years had grown prodigally in the moist woods roundabout. Stories are told of the penury of his circumstances before he conceived the idea of marketing the ferns, contrasted with his present affluence; but one and all acknowledge him as the benefactor of the community.

The spinulose shield fern I have seen growing in luxuriant abundance in the New England and Middle Atlantic States. Books on ferns state that it is to be found from North Carolina to northernmost Canada. I could not find it, however, in the mountains of western North Carolina, though I searched for it carefully. The books omit any mention as to how far west it grows—a question of some interest to me; for I was told that the Vermont crop was sold mostly to the florists of Chicago and Denver. Three feet is about its maximum growth; its width will average about one-third of its length. It is an ever-

green, very hardy, of a darker, richer green color than the other ferns that grow indigenous with it, and of a feathery, lace-like texture. Brown fruit specks dot its underside at picking time, and its stalk is somewhat scurfy.

It is very gregarious, six to a dozen or more stalks clustering about a common center, the clusters grouping themselves often into beds covering a considerable area. It grows in moist woods, being especially thick near water courses. It likes the cooling protection of boulders and of fallen, decaying trees. Often it takes root in the latter's crumbling, pulpy wood, or in some crevice of the former where a little soil has found lodgment, growing as hardy as its fellows in the fertile soil of the woods.

Picking begins about two weeks before Labor Day and lasts about five weeks. Everyone is welcome to pick; all are treated alike by the dealer. When the picking is good and the pickers numerous he pays them thirty cents for a thousand ferns, bunched. When the supply of ferns near his agency has been picked, and it becomes necessary to go deep into the woods for them, pickers are not so numerous, and the price rises to forty cents a thousand. While in the spring of years when his sales have been heavy, sometimes before the snow has left the ground, he pays them ninety cents for a thousand ferns, bunched.

During the height of the picking season some families

earn as much as ninety dollars a week, clearing some five hundred dollars during the season. To do this means working from early morning until late at night for every member of the family. The men folks start out early in the morning with big hampers, which they fill and deliver several times a day to their women for bunching, at which task the men also assist at night.

The money the pickers receive is all profit, save for the cost of the thread used to bind the ferns into bunches. A few of the heaviest pickers do pay the larger land-owners a nominal amount for the exclusive privilege of picking on their land. This exclusive privilege, however, is of somewhat doubtful value; for though the land thus allotted is posted against the unlawful picking of ferns, little heed is taken thereof by pickers.



READY TO START IN THE MORNING

The land upon which I was privileged to pick as the guest of the owner was posted, but I saw many poachers. Conditions could hardly be otherwise. The country is very sparsely settled and unpatrolled, so that the cost to owners of enforcing the prohibition against fern picking is out of proportion to the privilege they grant. The notices, however, have a moral effect, for each time I noticed poachers they hurriedly scurried away.

Picking is not work—at least for those who do not do it for a livelihood. Mornings are long for early risers, at many summer resorts, and would have been at my Vermont hamlet had it not been for the ferns. Each morning after breakfast we started out for ferns. Our host very kindly loaned us hampers, into the largest of which, by careful arrangement, almost three thousand ferns could be packed. By noontime our hampers would be filled and our stomachs empty; for walking and climbing over the uneven ground of the woods, bending to pick the ferns and toting the hampers about made ravenous appetites.

The woods in the year whereof I write were the cleanest I have ever known them. They were absolutely free of bugs and insects, of creeping and flying things of any nature whatever. Picking under these circumstances was ideal, and was thoroughly enjoyed by all. Competition to be the first to fill a basket lent zest to the picking. Surprisingly little was said by the pickers, once they got started. Everyone took an absorbing interest in the work.

and labored as if their very subsistence depended on getting the hampers filled. A squirrel looking on could not have but remarked that we were as provident as he in supplying the winter's larder.

To one picking for the first time a little difficulty will be experienced during the first half hour or so of surely distinguishing the spinulose shield fern from the brakes that grow

all about it, often seemingly from the same root. This difficulty, however, is short lived. After a day's picking the question never arises in one's mind; while after a couple of days' picking, one can separate the fern from the brake with the fingers, the sense of touch serving to distinguish the stalk of one from that of the other. And it is this sense of touch that distinguishes the expert picker from the beginner. A beginner chooses the ferns he picks solely by eye, and picks them one at a time. The expert gauges the size and quality of the ferns almost by the feeling of their stalks; and instead of gathering them one at a time his busy fingers take, in one operation, all those of the cluster that are of proper size. The ferns are not pulled up by the roots, but are broken off a few inches below the lowest frond.

It is hard to say which is the more interesting—picking the ferns or bunching them. Personally I prefer the picking, because of the exercise it affords. But as to which is the more fascinating I must admit that the palm goes to the bunching. A few men picking by themselves do their own bunching,

tying the bunches with thread from a spool carried in the pocket and run through a buttonhole. Most of the bunching, however, is done at night. A picker who does not do his own bunching, pays half what the ferns sell for to have them bunched.

I have seen a room full of people alive with laughter and jovialty before bunching began, gradually subside into a seeming contented watching of the silent bunchers; then as gradually to take a livelier interest in the work, and finally to actively participate. Once the whole



THE COVETED SPINULOSE SHIELD FERN



BUSY BUNDLING THE FERNS



AFTER A GOOD MORNING'S WORK

room was bunching it became a silent race to see who would finish first, and who would have the greatest number of bunches, for it was always something of a lottery as to how many ferns a basket contained.

The ferns are put up in bunches of twenty-five. Each bunch must contain an assortment of sizes, varying from about nine inches to eighteen inches. The largest is laid on a table or other flat surface, and the others on top of it. The stalks of the twenty-five ferns are then bound together with a piece of thread. Time is not wasted to tie the thread; the end is simply wedged between the stalks.

The bunched ferns are delivered to the dealer usually in the same hamper used in picking them, with a memorandum of the owner's name and count. The dealer's agents verifies the count and so expert has he become in the handling of bunched ferns that he is able to tell pretty closely from the heft and appearance of a bunch whether it contains twenty-five freshly picked, well conditioned ferns. Saturday is pay day for the pickers. A record of the number of bunches delivered by each picker is carefully kept; and any time after the money arrives, a picker may collect his account. The certainty of the pickers receiving their money when due, and the acknowledged fact that the industry is a boon to the hamlet, seem to have been

elements in the success of this dealer. One's first thought on seeing this industry is to engage in it as a dealer rather than as a picker. But closer observation shows

this to be easier thought of than done. An organization of quite a size is necessary for its conduct. The ferns have to be kept in cold storage. The wastage is great, and considerable care is necessary to shield the fern from injury. If kept too long piled at the receiving station, it will begin to sweat, which is detrimental to its preservation. It seems also to be subject to a blight, which attacks it as a brown discoloration, and pickers are warned to allow no such ferns to be found in their bunches.

In the case whereof I write, the dealer had to pack his ferns in crates and truck them thirteen miles to the railroad, which took them twenty miles farther to his warehouse. At his warehouse he had to reinspect, re-sort and rebunch the ferns. From the locality where I picked he took ninety million ferns the previous year, how many more from other localities I did not

hear. When he started business he must have found the nearby markets quite fully supplied, and had to develop new ones. In no other way can I explain his sending them to such a distance as Chicago and Denver from Vermont.



ON THE WAY TO DELIVER

ATTENTION is being given by the United States Forest Service to the importance of landscape engineering in the National Forests. One of the questions continually arising involves the proper way to lay out a summer camp site to make the most of the natural beauties of a location. Another has to do with the principle to be followed in running a scenic trail to insure the best views for the traveler. Still another deals with making ranger stations most attractive as dwelling places and the creation of designs which will best harmonize with the surroundings. To meet these and kindred questions Dr. Frank A. Waugh, an eminent landscape engineer of Amherst, Massachusetts, has visited a number of the Forests where recreation use is especially important. His trip was made at the request of the Forest Service. As a result he has prepared a report setting forth some simple principles of landscape engineering applicable to the various questions. These are intended to provide a basis for correct landscape engineering practice in the National Forests.

THE National Lumber Manufacturers' Association, with headquarters in Chicago, has compiled a handy reference of "Information on Wood and Where to Find it." This booklet is a directory of literature which may be had for the asking from the National Lumber Manufacturers' Association, California Redwood Association, North Carolina Pine Association, Northern Hemlock and Hardwood Manufacturers' Association, White Pine Bureau of St. Paul, Minnesota, Southern Cypress Manufacturers' Association, Southern Pine Association, West Coast Lumbermen's Association, Western Pine Manufacturers' Association and other sources, and is absolutely free.

Some of the subjects covered include: Barns, bee hives, bird houses, boats, bridges, bungalows, cars, canoes, cattle sheds, chicken houses, corn cribs, dairies, docks, factories, farm buildings, fences, freight cars, furniture, garages, incubators, kitchen cabinets, schools, silos, toys and warehouses.

THE HERONS

(Family Ardeidae)

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

WHEN nature evolved the herons to enliven the shore, she did not take into account the avarice of man nor the vanity of woman. She created birds that should have stood for all time as the emblem of grace. Take away life and there remains an ungainly mass of spindly legs and crooked neck worthless even for food. Nature might have expected, therefore, that the herons would be allowed to live and delight the

eyes of mankind forever. Unfortunately, however, she decorated certain of them during the breeding season with most beautiful and delicate plumes which retain their beauty even when ripped from the backs of their owners. Shrewd milliners, taking advantage of the vanity of women and the relentlessness of fashion, saw in these plumes great fortunes. Fashion and ignorance did the rest, so that today the most beautiful species, the egrets, are nearly extinct. Indeed they might long since have

been so had it not been for the determination of a group of bird lovers, who formed the National Association of Audubon Societies, and for the far-sightedness of a nature-loving President, Theodore Roosevelt, who set aside certain areas of waste land as Federal Bird Reservations to give the vanishing birds a last resort of safety.

There are about 100 species of herons in the world, found mostly in tropical and subtropical regions, but at least a dozen are found in the United States and Canada.

They vary in size from the least bittern whose body is not much larger than a robin's to the great blue heron that stands about four feet in height. In color they vary from the streaked brown plumage of the bitterns, through various shades of chestnut, blue and gray, to the snowy white of the egrets. They are variously ornamented with elongate feathers, either on the crown, foreneck, or as in the egrets, on the middle of the back.

In the bittern there are some fluffy white feathers beneath the wings that are displayed during the courtship performances.

The majority of herons are gregarious birds, roosting and nesting in colonies. They scatter when fishing, however, and hunt singly, either stalking quietly through the shallow water or resting motionless on the shore waiting for some hapless fish to swim within reach of their javelin-like bills. One species, however, the reddish egret, is said to run rapidly through the shallow water

in pursuit of small fish. Most herons nest in the trees or large bushes of extensive swamps but the bitterns nest on the ground in treeless marshes. Herons' nests are always poorly made structures of sticks, so thin that the pale bluish or greenish white eggs can usually be seen from below.

Young herons are covered with long shaggy down when hatched and even before they acquire their real feathers, they are able to climb from the nest and cling



Photograph by O. E. Baynard

WHERE AIGRETTES COME FROM

They are worn on the back of the beautiful egret herons during the nesting season. Egret at nest at Orange Lake (Florida) Rookery, an island bought and guarded by the National Association of Audubon Societies.



Photograph by Verdi Burtch

SKY SCRAPERS

Great Blue Herons nest in the tallest trees of big swamps—Single trees sometimes contain from five to ten nests.

to the branches using their wings and even their necks to assist them. If they drop into the water below, they are able to swim, using their wings as well as their feet for propulsion, but their heavy bodies sink until only the head shows above the surface. When alarmed in the nest or on the branches, the young herons stretch up their long slender necks and remain perfectly quiet so that they look more like sticks than like birds. They are fed in an unusual way. The old bird, having swallowed the fish or frogs which it has caught, returns to the nest with them in its crop. The young bird then seizes, with a scissor-like action, the base of the bill of the old bird which turns its head on one side and vigorously but deftly disgorges the food into the throat of the

young. The process is rather difficult to describe in a few words but a glance at the accompanying photograph of the least bittern feeding its young should make it clear.

Three members of the heron family in North America are called bitterns and they inhabit the reedy marshes



NOT IN HIS ELEMENT

Young herons are not meant to swim like ducks but they get there just the same when they fall from their nests into the water.

rather than the tree covered swamps that are the favorite nesting places of the other herons. The American bittern is the larger of the two, being about the size of a large fowl, but of a very different shape, although some people call it the "mud hen." Its streaked brown coloration matches so closely the dead vegetation in the marsh that

when quiet it is almost impossible to see. This camouflage is furthered by a habit which the bird has when alarmed, of pointing its bill toward the sky and presenting only its broadly streaked neck and breast toward the intruder. As one circles about the spot where he knows the bittern is hiding, the bittern also slowly rotates so as to present always the same color pattern which matches exactly the lights and shadows of the reeds, and when the wind blows over the marsh, causing the reeds to sway, the bittern seems to perfect the simulation by swaying with them. Early in April when the bittern returns from the south and concealment in the marsh is scarce, it is easily overlooked because it resembles some broken snag projecting from the water. One of the most striking characteristics of the bittern is its call which has given rise to the names "stake driver" and "plum puddin." Though not actually very loud the sound is remarkably



Story of National Association of Audubon Societies

THE COST OF A PLUME

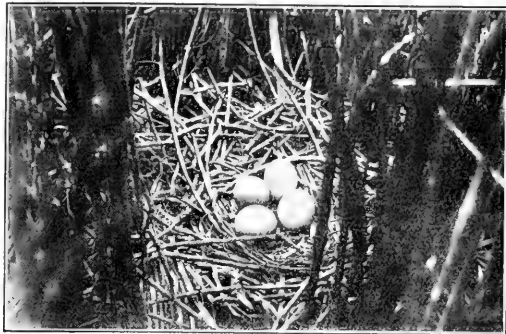
This pathetic picture tells its own tale and needs no enlargement.

penetrating and can be heard for a distance of half a mile or more. The first part of the performance which sounds like the tapping of a wooden stake with a mallet is made by the bird snapping its long bill. Then follow some deep liquid notes that sound like the "working of an old fashioned wooden pump or "pouring water out of a huge jug;" *ooble-oob, ooble-oob, ooble-oob*. The sound is accompanied by curious gulping contortions but the bill is not held in the water nor is it filled with water as was once supposed.

The bittern nests on the ground, usually in the sedges fringing the marsh, but occasionally it builds its nest where the water is deeper. The eggs are about the size of small hens eggs and look as though they were stained uniformly with coffee.

The least bittern looks like a fair sized bird when seen on the wing or when sneaking through the flags, but it is

of the parts which are buff in the least bittern are a rich chestnut in the Cory bittern. It is a very rare bird as only about thirty specimens have ever been found and inasmuch as these have been scattered over a large part of the range of the common least bittern, from Florida to Ontario, many ornithologists now believe that it is



COFFEE COLORED EGGS OF THE AMERICAN BITTERN

They are laid on a platform of reeds, usually in the dryer parts of the marsh.

merely a color phase of the least bittern similar to the red phase of the screech owl. The term erythronism has been applied to this phenomenon where an excess of red pigment is developed.

Of the true herons, the little green heron is undoubtedly the commonest and most widely distributed. It is a



Photograph by O. E. Baynard

SCENE IN A PLUME HUNTER'S CAMP

Egret feathers mean the death of hundreds of birds and the starving of thousands of young.

mostly neck and legs and its body is relatively small. It has much the same habits of concealment as its larger cousin but its notes are very different, resembling the distant croaking of a frog or the slow cooing of a dove. Its nest is a platform of rushes built above the water, usually in the cat-tails or reeds, and its three to seven eggs are more like those of other herons, being pale bluish-white.

The writer once had the experience of tramping through a marsh and discovering one of the nests of this bird and actually counting the eggs before he realized that the bird itself was standing on the back of the nest, so completely did it simulate the dead stubs of cat-tails all about it. This particular bird seemed not to know fear and when it finally realized that it had been seen, it assumed an entirely different, threatening attitude and prepared to defend its nest with vigorous blows from its sharp bill.

A third species, the Cory least bittern, is practically identical with the common least bittern except that all



"BE IT EVER SO HUMBLE"

A Green Heron approaches its crude nest of sticks in the willows fringing a pond.

bird about the size of a crow and indeed at a distance, when on the wing, looks not very different, for, like other herons, it carries its head back on its shoulders and conceals its length of neck. It furthermore makes up for

its abbreviated tail by trailing its legs out behind. At close range, however, it is seen to be very different for, although it is not very green, it is certainly not black

four feet high and having a wing expanse of about six feet, even greater than that of an eagle. Its general color is grayish, lighter on the head and neck, with a black belly and a black stripe through the head. It nests in colonies in the larger swamps, usually in the tops of the tallest trees, one tree often containing from five to ten nests. The tops of the trees are usually killed by the excrement of the birds but the herons continue to use the same trees as long as they will hold their nests. In some

of the treeless regions of the west, the great blue herons nest on the ground in the marshes or in bushes on islands.

The herons are powerful flyers, traveling with measured beats of the wings and occasionally sailing so that they are able to feed many miles from their nesting grounds. When the young are ready to fly in late July or August, they scatter to all parts of the country wherever there is a good feeding ground. At such times they are unsuspicious and many are killed by the amateur marksman for, unfortunately, even in such progressive states as New York, they are not given protection by law. This is be-



A BITTERN ROOST

The Bittern pulls together the tops of the reeds with his long toes, gives them a twist and makes a comfortable bed on which to sleep above the water.

like a crow. Its crown and wings are greenish but its conspicuous neck and breast are largely chestnut and its back is bluish gray.

The little green heron differs from others of the true herons by leading a more solitary existence, seldom more than a single pair nesting in one clump of alders or willows. When frightened or upon taking wing, the green heron usually utters a rather harsh "skeow" and its vocal powers, even during the nesting season, are never much more musical.

The next best known species of heron is the great blue heron, in some districts misnamed the "crane." It is very much larger than the green heron, standing about



LOOKS LIKE A BITTERN

But is an immature Black-Crowned Night Heron.



Photograph by Ferd Burich

AN AMERICAN BITTERN "NOT AT HOME"

When she does not wish callers she assumes this position and usually goes unseen.



BIRD OR BROKEN REED?

The Least Bittern assumes this position when alarmed and usually escapes detection.

cause a few fishermen believe that they are destructive to trout when, as a matter of fact, trout form a very small part of the diet of a very few individuals and these could advantageously be dealt with in other ways than by removing protection from the entire species. Fortunately real sportsmen are as fond of the herons

ing out at dusk when their loud "quas" are familiar sounds in parts of the country where they are found. They nest in large colonies like the great blue herons but usually in smaller trees and sometimes in woods even at a distance from water.

The yellow-crowned night heron is a very different looking bird, confined to the marshes of the southern states and thence southward into the tropics. It nests in pairs along streams or associated with colonies of other herons.

One of the commonest herons of the southern states is the little blue heron which, because of the lack of ornamental plumes, has been allowed to survive even in large colonies. It is about the size of the little green heron and like it has a chestnut head and neck. The crown is the same color as the rest of the head, however, and the entire upper parts are dark slaty blue. The immature birds are pure white except for the tips of the wings and look very much like snowy egrets but, of course, do not

have the ornamental plumes. Mottled individuals in the process of changing from white to blue are often seen.

A somewhat larger species but similar in color, except for the white on its under parts, is the Louisiana heron which in parts of Florida still occurs in rookeries containing thousands of birds. A still larger species and much rarer is the reddish egret which differs from both the little blue and

Louisiana herons in having a tuft of about thirty "aigrette" feathers growing from between the shoulders during the breeding season. It likewise has a white immature phase which was once thought to be a distinct species and called "Peale's heron."

The best "aigrette" plumes are found on the two white egret herons in which the "aigrettes," like the rest of the bird are snowy white. The larger egret approaches a great blue heron in size while the snowy egret is but little larger than the little green heron. Both species have about fifty straight plumes growing from be-



A NOVEL MARKET BASKET

The Least Bittern brings back the fish and frogs to its young in its throat and regurgitates them as shown in the next picture.

as they are of the fish and many an ardent disciple of Isaac Walton is willing to share even his trout stream with the herons for the sake of having them about.

The same may be said of the bitterns which are likewise denied protection. Occasionally an unfortunate bittern takes up its residence in a marsh bordering a trout stream and in his hunt for frogs and tadpoles may occasionally catch a trout fingerling. The vast majority of bitterns, however, live in the warm marshes where trout are never found and where they fall easy victims to the Sunday sports in their rowboats and the small boys with Flobert rifles hunting for the largest targets they can find.

The black-crowned night herons are about the size of the bittern and indeed the immature birds closely resemble them though the adults are entirely different, being nearly pure white or pearl gray in color with black crowns and mantles. They are nocturnal in their habits, usually roosting in trees during the day and com-



BREAKFAST A-LA-MODE (HERON)

The old bird turns its head on one side and the young grasps the base of its bill. Breakfast is served by vigorous pumping of the old bird's throat.

tween the shoulders and extending beyond the tail.

Forty or fifty years ago both species were common all through the south and especially in Florida but today they are the rarest of the herons. Were it not for the bird reservations and the non-sale of plumage laws, it

Ward's heron, as it is called, and the great white heron. It resembles the Ward's heron but has a white head and neck. It has been called Wuerdeman's heron but its true status is not yet known.

In some parts of the country the herons are incorrectly called cranes, which, indeed, they resemble, the differences between them being more of anatomy than general appearance. In flight the herons always carry their heads back on their shoulders while the cranes carry



ONE OF THE RAREST OF NORTH AMERICAN BIRDS—THE CRY LEAST BITTERN

Many ornithologists believe it to be a color phase of the common least Bittern. Photograph of a wounded bird.

is probable that they would now be practically extinct. Twenty years ago every woman of fashion wore "aigrettes" in her hair or on her bonnet. Today, if she does so she will be arrested as it is against the law to have them in one's possession. Doubtless they will now go "out-of-style" though there are still a few foolish individuals who cling to their once valuable plumes in the hope that the laws will be repealed and that they will once more come into fashion; and this in spite of the fact that they know that each set of plumes means the death of a breeding bird and the starving of a nest full of young.

There is another white heron found in southern Florida called the great white heron. It is about the size of the great blue heron and has no plumes. There seems likewise to be an intermediate form between the Florida great blue or



PRESENT DAYONETS

A Least Bittern defending its nest when it knows it has been discovered.

their necks fully extended. The herons bills are more or less angled while the cranes are rounded and the herons have all four toes well developed and on the same level while the cranes have the hind toe small and elevated. Cranes, moreover, are now rare in all parts of the country and have been practically exterminated in the east.

CARRIER pigeons will assist in protecting the forests of Oregon and Washington from fire, if experiments inaugurated in this district by Forest Examiner W. J. Sproat prove successful. Mr. Sproat has had some experience with the use of pigeons and believes they will be a valuable means of communication in emergencies and for carrying reports of fire and other

messages. The matter has aroused interest in the district office, and the birds will be tried out on several of the forests during the coming fire season. Mr. Sproat will take back to Bend with him five pairs of the birds for use on the Deschutes. Supervisor Sietz also plans to try them out on the Cascade.

SCOTCH LUMBER CUT BY NEW ENGLAND MILLS

The report of the operations in Scotland of the New England Saw Mill Units has been published by E. C. Hirst, State Forester of New Hampshire, who was in charge of the particularly interesting operations.

ABOUT a month after the United States entered the war the Massachusetts Committee on Public Safety learned that Great Britain was in distress for lack of skilled lumbermen and foresters to cut her timber. It was at once proposed that New England should raise, equip and send to England ten portable saw mill and logging units. The British gratefully accepted the offer, it was unofficially approved by Secretary of War Baker and receive the enthusiastic support of the Governors of the New England States.

To work out the details of the undertaking and to make its operation effective the Massachusetts Committee on Public Safety appointed a committee of which the chairman was W. R. Brown, of Berlin, New Hampshire, a director of the American Forestry Association and a member of the Lumber Committee of the Council of National Defense. The other members of the committee were: James J. Phelan, Vice-Chairman, Massachusetts Committee on Public Safety; Harold G. Philbrook, Treasurer, Vice-President, Connecticut Valley Lumber Company; F. W. Rane, Secretary, State Forester of Massachusetts; George S. Lewis, Treasurer, Connecticut Valley Lumber Company; Philip T. Dodge, International Paper Company; H. W. Blanchard, H. W. Blanchard Lumber Company; Garrett Schenck, Great Northern Paper Company; Hon. Herbert B. Moulton, Parker and Young Company; I. B. Hosford, St. Croix Paper Company; Martin A. Brown, Woodstock Lumber Company; George E. Henry, J. E. Henry and Sons; Samuel H. Boardman, President Eastern Shook and Wooden Box Association; J. M. Parker, St. John Lumber Company; Marshall T. Wood, Lande Manufacturing Company; H. B. Stebbins, H. B. Stebbins Lumber Company; Chester C. Whitney, Perry Whitney Lumber Company; J. H. Hustis, Receiver, Boston and Maine Railroad; L. S. Tainter, Conway Lumber Company; E. C. Hirst, New Hampshire State Forester; Forest H. Colby, Maine State Forester; W. O. Filley, Connecticut State Forester; J. B. Mowry, Rhode Island State Forester.

It is significant of the scope and influence of the American Forestry Association that of the 23 members of this committee twelve are members of the Association. This representation includes, in addition to Chairman Brown, Messrs. Philbrook, Rane, Dodge, Blanchard, Martin A. Brown, Henry, Tainter, Hirst, Colby, Filley and Mowry.

To send ten units for saw mill and logging operations in England involved the raising of a fund of \$120,000. The cost of each unit is placed at \$12,000. This money was provided over night. Through its Governor and its

committee on public safety each of the New England States subscribed the sum required for a single unit. With six units thus provided for, there was no difficulty in raising funds for the four remaining units by private subscription among the paper manufacturers, lumbermen and timberland owners of New England.

The following report on the work of the units is made by Manager Hirst:

The commercial timber in Scotland is in plantations on large estates. There is practically no natural growth. The plantations were set out partly to afford game cover and partly on account of the land owners interest in timber growing. For many decades prior to the present war there was little commercial incentive for planting anywhere in the United Kingdom. Cheap transportation permitted duty free lumber from Russia, Sweden, Norway, Germany and even America to be delivered to consuming centers in England and Scotland at such low prices that investments in home grown timber yielded a small and uncertain return. National emergencies have from time to time stimulated felling and planting. Thus, on a considerable part of the woodland operated by the New England Saw Mill Units the previous clear cutting furnished lumber for the Napoleonic Wars, and the trees planted soon after were of splendid size to furnish high grade dimension lumber during the last year.

The most important commercial trees in Scotland are Scotch pine, larch and Norway spruce. The first named is that planted in largest amount, the trade name for the lumber being "Scots Fir." In quality the lumber is about half way between our white pine and Norway pine. The larch is a native of the Austrian Tyrol and although planted for centuries in Britain, seed is still obtained from the native home of the tree on the continent. The larch furnishes excellent structural timbers, but is springy and more difficult to saw to accurate dimensions than the others. The Norway spruce is a rapid grower and much like our white spruce. It is planted only on moist ground.

The war found Great Britain in a serious situation in regard to timber for military purposes. Much greater supplies of timber were needed for war than had been anticipated and enemy submarine activities soon became a serious hindrance to securing timber from over seas on which the country had become accustomed to depend. It was necessary for the Government to organize a Timberland Supplies Department, and then immediately to requisition and purchase timber from private estates for the war industries of Britain as well as the large amounts which it became necessary to ship across the Channel for

military purposes in France. Military contingents from the Dominions over seas were required to carry on lumbering operations on a scale large enough to supply the war industries. It was to help out this serious situation that the New England Saw Mill Units were organized.

The small timber supplies of Great Britain have been very heavily depleted by the war cuttings and these conditions have awakened the country to the need of larger areas of forests. The Reconstruction Committee of Great Britain have recommended the establishment of a Forestry Department in the Government whose duty it shall be to support a public policy of timber growing, adequate for the country. This Department was established prior to the termination of hostilities.

The headquarters of the New England Saw Mill Units was at Ardgay, Ross-shire, Scotland, a village at Bonar Bridge Station on the Highland Railway, about fifty miles north of Inverness. A storehouse was built for the supplies needed for the mills and camp kitchens. Here the headquarters was located and the supplies for the men and horses were checked out to different units each week. All mills were located within five miles from headquarters, three operating on a timber tract purchased by the Government from Andrew Carnegie in Southland-shire and seven operating in a tract bought from Sir Charles Ross, in Ross-shire. These tracts were estimated to carry about 6,000,000 and 18,000,000 board feet respectively. The saw mill equipment arrived about the middle of July and lumber production got under way in August.

When manufacture first began in August the lumber produced was sent to port for shipment to France. Later in the fall specifications for France were cancelled and from then on practically all shipments were made for British war industries. About 60,000 railroad ties were railed from our loading bank at Bonar Bridge and a large amount of 3 and 4-inch dimension timber was made. A considerable part of the dimension timber was cut for special requirements. Very little lumber was wasted in the slabs, as round edge boards were taken off the outside edge of the logs when sawing dimension material. A great deal of pitwood was produced in the woods operations for use by the colliery companies. These were made from the tops and large limbs. This pitwood was graded into 3, 4, 5, and 6-inch diameter sizes, the length ranging from 6 to 14 feet. In cost accounting it is considered that one lineal foot of pitwood is equal to one board foot of manufactured lumber. The total production by the New England Saw Mill Units was 19,673,100 board feet of lumber and pitwood.

Sir John Stirling Maxwell, under whose direction the New England Units worked in, said of them: "The ten mills played a notable part in providing for Great Britain's timber needs. Their output man for man through the twelve months of your stay has been the highest that any operation under the charge of the Department can show. The type of mill you brought over, standing as it does midway between the large mills of the Canadians and the small mills of this country, has proved

admirably adapted to the timber you had to work and most economical of labor. While admitting the great benefit derived from the larger type of mill in providing the armies in France with quick supplies of trench timber and railway ties when speed was everything, most experts are agreed that the smaller type is likely to prove best in normal times in a country like this where the blocks to be felled are small and economy is the first object. Your mills represented a compromise between the two, singularly apt to the moment of your arrival. It would be easy to expatiate on the international value of your timely aid. It is on such acts that friendships are built. A gush of praise or gratitude can only spoil them and there has been nothing in the attitude of your colleagues or yourself to invite it. New England saw her help was needed and she gave it and we welcomed it. That is all. But you and I know that we have not worked together without losing some old prejudices for which newspapers, tourists and the too wide Atlantic are responsible, or without realizing how refreshing and fruitful the intercourse of friendly nations can be when they speak the same tongue and value the same things."

STATE Forester Alfred Gaskill, of New Jersey, has announced the purchase of 1,400 acres of timber land in Woodland township, Burlington County, by the State Department of Conservation and Development of New Jersey. This land increases the area of the Lebanon State Forest and joins several detached state-owned areas into a compact unit capable of more efficient management.

There are now six state forests in Burlington, Ocean and Sussex Counties, each under the charge of a resident forest ranger. The forests are being protected from fire and abuse, the production of timber is aided and encouraged, technical forestry studies and experiments of value are carried on, timber and wood products are sold when their removal is beneficial to the forests, and roads, trails and camp sites are developed for public use.

J. GERRY CURTIS, for some time past Assistant Forester of the city of Pittsburgh, has been appointed Forester and landscape engineer for the Carnegie Steel Corporation, in charge of the extensive work in planting, etc., now under way in connection with the construction of several hundred new homes for employees of the mills. A "home beautification" policy has been adopted and the streets are to be lined with shade trees, the front-yards dotted with flower beds and shrubby masses, while fruit trees and berries are to be used extensively in the back-yards. The back-yard fences in the older settlements also are to be removed and hedges of barberry substituted. Back-yard garden clubs have been organized and prizes will be awarded each year for the best vegetable and flower gardens. The fact that special stress is to be laid on the training of the children in the care and protection of trees, shrubs and flowers plants promises well for the success of Mr. Curtis' plans.

EDITORIAL

WHY WE NEED MORE FOREST RESEARCH

ONE of the biggest economic problems before the United States is the production of wood to meet the future needs of our growing population and industries. No one at all familiar with present conditions can doubt that a very serious shortage of timber, with attendant high prices, hardship for consumers, and hindrance to the economic development of the country, will be upon us within a very few years unless vigorous action is taken immediately to insure continuous forest production on forest lands.

A movement, which has already a large measure of popular support, is under way to bring about this continuous production, not only from the public forests but also on the much greater area of privately owned forest land. But it must be borne in mind that the unanimous support of the public, of the law-making bodies, and of the forest owners themselves, will not suffice to insure the production of the right material in quantities sufficient to meet our future needs. Forest protection, conservative cutting, reforestation, restriction of cut to annual growth, will result in continuous crops of some kind of timber, but if undertaken in a haphazard way will not result in continuous crops large enough to meet even our present needs, nor is it at all certain that we shall have either the sizes, grades, or even the species of lumber which will be needed.

When good land is cheap, production and transportation costs low or nil, population sparse, there is little need for study of methods to increase food production, or of selection of varieties to plant. The Indian in the Tropics, who has only to go out and gather food which grew without any effort on his part, has no need to indulge in agricultural research. But with a highly developed civilization, with its ever-increasing population and resultant decrease in per capita area of agricultural soil, with increasing costs of production, and with the necessity of carrying the products of the soil long distances to the consumer, it becomes imperative to investigate methods by which a maximum amount of food can be produced, at the lowest practicable cost, on soils best adapted for each particular kind of crop. It is also necessary that the production of different kinds of foods bear some relation to the requirements of the consumers for the various products. It would not do to devote all agricultural land to the raising of cereals, for instance, even if it should be found that the maximum number of calories of food could be produced by doing so.

In forestry the same rule holds. The "timber-miner," who only harvests what Nature produced, and cares nothing for the future, has no use for forest research. But for a growing nation, whose forests under present methods are producing but a fraction of its needs, and even under the best methods that can be applied with our present knowledge will produce little more than enough for merely present needs, such research is of fundamental importance.

Foresters have yet barely scratched the surface in the study of American forests. It is not enough to know that certain methods of cutting in the Southern Appalachians, for instance, will be followed by reproduction, and that such reproduction will grow rapidly and produce valu-

able timber. It is necessary to know what method will produce the *most valuable timber*, or the timber which will best meet the national needs, and at the most reasonable cost; it is necessary to know just what species or mixture of species will succeed best under each given set of conditions; it is necessary to be able to say definitely in advance just what will be the yield of a given species managed in a given way on a specific tract of land, and what it will cost to produce it.

From the standpoint of the private owner it will not be enough to say that by adopting such and such a method he will make a profit; he wants to know how he can get the *largest possible* return from his investment in land, labor, and money. From the standpoint of the nation, it is not enough to know that certain methods will result in continuous forest production on forest soils; it is necessary to know which of several methods will best accomplish this result, and what methods will insure the proper proportion of different sizes and of different grades of material, and of different species.

We have reached a turning point in the development of forestry in this country. There are ample social, economic, production and growth data to clearly show the need for a change in our methods of handling our timber lands. No further data are necessary to prove to any intelligent observer of our forest conditions that unless our cut-over lands, unsuited for agriculture, are turned back into forest production, we shall in the near future be at a serious economic disadvantage.

Foresters have a sufficiently well worked out plan for remedial legislation, and enough of basic knowledge for formulating some simple silvicultural procedure by which to maintain continuous production in each forest region. But even as it is, if the forestry profession were confronted tomorrow with the responsibility for drawing up a plan of management for all the forest lands of the United States, it would be put to a severe test, just as was the case at that time of the placing of the National Forests under forest management.

The Forest Service found it necessary to establish eight or nine experiment stations to solve the technical problems that immediately arose in marking timber, in working out methods of brush disposal, methods to secure natural reproduction, methods of artificial reforestation, and similar problems. If the profession, therefore, is not to be content with merely securing some kind of growth on cut-over land, no matter how inferior it may be as compared with the original stand, but desires to be able to secure forest growth of the highest economic utility, it must set itself at once to the task of securing more fundamental facts upon which to base its practice on the vast area of privately-owned timber land.

The only way in which such data can be obtained is by long-continued, painstaking, scientific research. They cannot be obtained in a year or in a few years as in the case of agricultural investigations which deal with annual or biennial crops, but require long periods.

Is it not time that such research be started on a very much larger scale than has been undertaken hitherto, in order that when the mandate comes, we foresters shall not be found lacking?

SEAPLANES TO BE USED FOR FOREST FIRE PATROL

WORK IN QUEBEC

BY ELLWOOD WILSON, EDITOR, CANADIAN DEPARTMENT

THE Province of Quebec has reason to be proud of itself. After many difficulties, which at many times seemed insurmountable, two seaplanes for use in forest fire patrol and mapping have been obtained and the first machine has been flown from Halifax, Nova Scotia, to Lac a la Tortue, a little village about two miles from Grand Mere, and is in actual use for patrol work. About three years ago the Directors of the St. Maurice Forest Protective Association discussed the practicability of using airplanes for patrolling, and a committee was named to look into the feasibility of the plan. They reported that it seemed practicable and in nineteen seventeen an effort was made to get a machine and pilot, without success. In nineteen eighteen another effort was made to put the scheme into practice. On Christmas Day, 1918, Mr. Allard, the Minister of Lands and Forests, sent for the writer and told him that he was much interested in the idea and would contribute \$2,000 toward an experiment. At the annual meeting of the St. Maurice Forest Protective Association a sum of ten thousand dollars was voted. The writer, after considerable study, decided that owing to the difficulty, amounting practically to an impossibility, of providing landing places for airplanes, that seaplanes were the only machines possible. It was learned that the Department of Naval Affairs of the Dominion Government had in storage at Halifax 12 seaplanes turned over to it by the American Navy at the signing of the armistice. The Department was asked, through the Acting Minister, Hon. A. K. McLean, to loan two of these machines. After much consideration and discussion he agreed to loan them and an agreement was entered into to take over these machines. The Minister of Marine, the Hon. C. C. Ballantyne, who had been absent in California on account of serious illness, returned to Ottawa and at once decided that he would not loan the machines, and he said that proper safeguards for their return to his Department had not been put in the agreement. However, after a long discussion of the matter, he finally consented to allow the machines to be loaned on the original agreement. Much credit is due to the two gentlemen named above for their action in making possible this experiment. The Montreal Branch of the Aerial League of Canada also co-operated in helping to get these machines, by sending a deputation to Ottawa to see the Minister, and by many helpful suggestions. The President, Sir Charles Davidson, gave much needed legal advice and helped in other ways.

The pilot engaged by the Association, Lieut. Stuart Graham, of Montreal, had

had experience with both airplanes and seaplanes, having served in the Royal British Naval Air Service and having been decorated for sinking a German submarine after his engine had gone dead. He went to Halifax and with his engineer, Mr. Kehre, and with the help of the officers of the Halifax Station, assembled seaplane No. 1876. He left Halifax on the afternoon of June 5 and flew to St. John, New Brunswick, without any trouble except a fog which lifted just as he reached St. John. He remained there over night and left the next day for Lac Temiscouata, Quebec. In flying across the State of Maine, he encountered a heavy thunderstorm and seeing a lake of the same shape as the one he was looking for made a landing, only to find that he was on Eagle Lake, Maine. He remained there over night and flew to Lake Temiscouata the next morning. He had ordered gas and oil sent there but it had not arrived so he was forced to take automobile gasoline and go on to Riviere du Loup on the St. Maurice. On the morning of the 8th of June, the sea water was very rough and a high wind and strong tide, and in trying to take off the nose of the machine went entirely under water drenching Mrs. Graham, who was in the forward seat acting as navigator. He left Riviere du Loup at 1 P. M. passed over Quebec City at 2.25 and arrived at Three Rivers at 3.10. Here he was met by Messrs. R. F. Grant, President, and Mr. Henry Sorgius, Manager, and Ellwood Wilson, a Director of the St. Maurice Association. At the wharf the Hon. J. A. Tessier, Minister of Roads and Mayor of the City of Three Rivers, formally welcomed Lieut. and Mrs. Graham, the Mayoress presenting Mrs. Graham with a bouquet of beautiful flowers. After a rest the party took the air at 6.50 and arrived at Lac la Tortue at 7.10. The trip was made without incident or mishap of any kind, the four hundred horse power Liberty engine never missing a stroke. The plane seems to be ideal for work over forests such as those in Quebec where lakes for landing abound. Its gasoline capacity is a little low for long flights. The machine lands and takes off beautifully. Mrs. Graham has named the first machine "La Vigilance." Lieut. Graham leaves the 11th of June for Halifax to bring up the second machine and will then commence his patrol and photographic work. Complete cost records are being kept and will be published at the end of the season.

This is the first use of seaplanes in Canada for other than war purposes, the first flight of any kind ever made from Halifax to Quebec, and I think the first for commercial purposes ever made in Can-

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of reference. Address Box 875, care American Forestry Magazine, Washington, D. C. (1-3)

WANTED: Young forester, preferably married, for clearing and maintaining woodland on small estate, operating private nursery, etc. Will pay \$80 or better, depending on qualifications and experience. Six room residence on state road included. Address Box 750, care American Forestry Magazine, Washington, D. C. (7-9 19)

ada. The Managers of the various Companies which make up the St. Maurice Forest Protective Association have signified their intention to inspect their timber limits from the air, and photographic maps will be made for any timber holders in the Association who wish them.

A small station with living quarters and machine shop is to be prepared for the machines and the fullest possible use will be made of them.

VALUE OF NUTS

Nuts can and do take the place of meat in the diet with beneficial results, and with the growing scarcity of meat due to the world war, they are bound to be in great demand at good prices in the future.

The comparative food value to the pound in calories is shown by the following table:

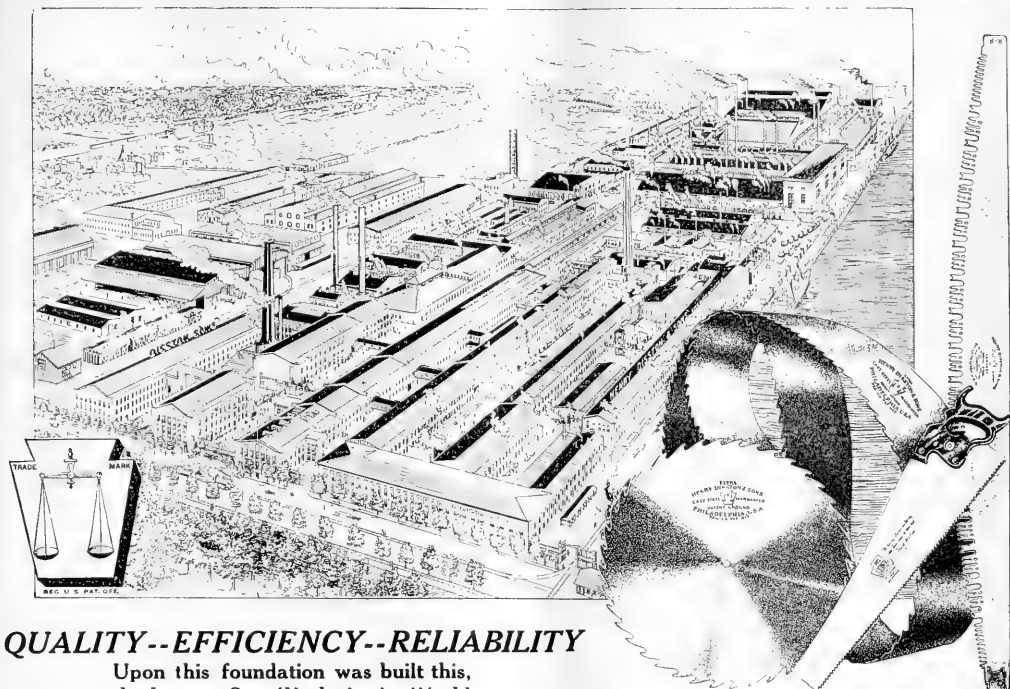
Round Steak	950
Wheat Flour	1,650
White Bread	1,215
Dried Beans	1,605
Raisins	1,005
English Walnuts	3,075
Pecans	3,415

It should be noted here that the true value of any article of food should not be measured by its cost, but by what it is worth to the consumer.

ONE POPLAR BRINGS \$11,000

A yellow poplar tree of giant size, which for years had stood in the hills of the Cumberland Mountain, where it was an object of unusual interest, has already brought approximately \$11,000 as a manufactured product. The tree was cut down by a local lumber concern and consigned to a firm in Cincinnati. When sawn, the product totaled nearly 7,000 feet of first-class lumber, with several hundred feet second-class lumber thrown in.

It is declared that this was the largest tree marketed from the eastern Kentucky fields within a half century. It was so large that for a number of years the task of marketing it was a serious obstacle, there being few lumbermen who cared to try to cut it down.



QUALITY--EFFICIENCY--RELIABILITY

Upon this foundation was built this,
the Largest Saw Works in the World



Keystone Saw, Tool, Steel and File Works

HENRY DISSTON & SONS,

PHILADELPHIA, U. S. A.

HELP TO REFOREST FRANCE

THE AMERICAN FORESTRY ASSOCIATION has undertaken the great task of helping to reforest the shell-torn, war-shattered areas of France; and to aid also Great Britain, half of whose forests were felled; Belgium, whose forests suffered terribly, and Italy.

The great humanitarian need, the prime economic importance, the broad constructive value of this work—all place it on a plane which gives it striking pre-eminence. Therefore, it is felt that every member of the American Forestry Association will desire to have a part, and as big a part as possible, in carrying out this program.

BY those who are competent to judge, it is asserted that the forests of France kept the Germans from Paris. How great a debt, then, does the world owe to them!

AMERICA can build no nobler memorial in Europe than by replacing the devastated forests of France, Great Britain, Belgium and Italy. Answer this appeal at once by sending your check for whatever amount you can afford, to the American Forestry Association. It will help to purchase the seed needed to replant the forests of our Allies.

Checks Should Be Sent to

THE AMERICAN FORESTRY ASSOCIATION
WASHINGTON, D. C.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filbert Roth.....	\$1.50
FOREST REGULATION—Filbert Roth.....	1.00
PRACTICAL TREE REPAIR—By Elbert Peets.....	2.00
THE LUMBER INDUSTRY—By R. S. Kellogg.....	1.10
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones.....	2.00
FOREST VALUATION—By H. Chapman.....	2.00
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw.....	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard.....	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. 1 and II, 4 Parts to a Volume—Per Part.....	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot.....	1.35
LUMBER AND ITS USES—R. S. Kellogg.....	1.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow.....	2.17
NORTH AMERICAN TREES—By L. Britton.....	1.30
KEY TO THE TREES—Collins and Preston.....	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling.....	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record.....	1.75
PLANE SURVEYING—John C. Tracy.....	3.00
FOREST MENSURATION—Henry Solon Graves.....	4.00
THE ECONOMICS OF FORESTRY—B. E. Fernow.....	1.61
FIRST BOOK OF FORESTRY—Filbert Roth.....	1.10
PRACTICAL FORESTRY—By J. C. Fuller.....	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green.....	1.50
TREES IN WINTER—A. S. Blakelee and C. D. Jarvis.....	2.00
MANUAL OF THE TREES OF NORTH AMERICA (exclusive of Mexico)—Chas. Sprague Sargent.....	6.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume.....	7.50
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough.....	6.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland.....	1.75
PRINCIPAL SPECIES OF WOOD; THEIR CHARACTERISTIC PROPERTIES—Chas. H. Snow.....	3.50
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe.....	5.00
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks.....	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst.....	1.50
TREES—H. Marshall Ward.....	1.91
OUR NATIONAL PARKS—John Muir.....	1.50
LOGGING—Ralph C. Bryant.....	1.50
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott.....	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes.....	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves.....	1.50
SHADE TREES IN TOWNS AND CITIES—William Sotatarof.....	1.75
THE TREE GUIDE—By Julia Ellen Rogers.....	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary.....	2.12
FARM FORESTRY—Alfred Akerman.....	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Reckard.....	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown.....	2.20
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record.....	1.75
STUDIES OF TREES—J. J. Levison.....	1.75
TREE PRUNING—A. Desf.....	.65
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss.....	3.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Toumey.....	3.50
FUTURE OF FOREST TREES—By Dr. Harold Unwin.....	2.25
FIELD BOOK OF AMERICAN TREES AND SHRUBS—F. Schuyler Mathews.....	2.00
FARM FORESTRY—By John Arden Ferguson.....	1.30
THE BOOK OF FORESTRY—By Frederick F. Moon.....	2.10
OUR FIELD AND FOREST TREES—By Maud Going.....	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor.....	2.50
THE LAND WE LIVE IN—By Overton Price.....	1.70
WOOD AND FOREST—By William Noyes.....	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney.....	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette.....	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.....	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel.....	5.35
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—By H. S. Gentry.....	2.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark.....	1.50
OUR NATIONAL FORESTS—H. D. Boerker.....	2.50
MANUAL OF TREE DISEASES—Howard Rankin.....	2.50

* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

TREES OF INDIANA

A new book of 300 pages on "The Trees of Indiana" has just been issued by the Department of Conservation of the State of Indiana. It contains a scientific description and a full-page illustration of each of the native trees of Indiana. The qualities and uses of the wood are given and the value of each species for shade and for forest planting is discussed. This is a book that should be in the hands of every wood lot owner and of everyone

who is interested in our native trees. It is especially recommended for teachers. It will enable them to teach their pupils to know our native trees. Any teacher can have as many copies as he can use to advantage in his school work. This book is free for the asking, but since the supply is limited, if a copy is desired application should be made at once. Send your order to the Department of Conservation, office of the State Forester, Indianapolis, Indiana.

BOOK REVIEWS

The Forest Ranger, by John D. Guthrie. Richard G. Badger, the Gorham Press, Boston, Mass. Price, \$1.50. This is a book of verses, collected and edited by John Guthrie, which he has been getting together for the past fifteen years. Many of them appeared originally in the pages of forest news letters issued on the different National Forests. Poetical or literary merit is claimed only for a few but they surely reflect the daily life and work of the Forest Ranger in the wide and beautiful forest lands of the West. Some are frankly parodies, some rhymes and jingles and a few are songs most familiar to the ranger and hummed around his lonely camp fire on the trail. The desire of the editor to bring together and put on record a true expression of the spirit of these men who have heard the "call of the forest and of the distant places" is well met by the little volume. The book is prefaced by a characteristic letter from Gifford Pinchot, in which he says to the editor: "In collecting these verses, you have put me, with every other Forest Service man, deeply in your debt." Mr. Guthrie's work was a labor of love and we predict for it a warm welcome, worthy of the spirit of its preparation.

Practical Tree Repair, by Elbert Peets, 250 pp., il., \$2.00. Robt. N. McBride & Company, New York.

No science is more firmly founded on known facts and methods than that of tree repair and the prevention of tree diseases. The author of this intensely practical book gives clearly and concisely complete instruction covering the treatment of wounds, rot-fungi, boring insects, filling of cavities, bracing, materials used in filling, treatment of cavities without filling, etc. Illustrated from photographs and diagrams, this book is useful alike to the owner of a home and to the man who intends to take up tree repair work.

Identification of the Economic Woods of the United States, by S. J. Record, \$1.75. Revised and enlarged second edition, John Wiley & Sons, Inc., New York.

The main differences between this edition and the first (1912) are as follows: (1) The Key has been entirely rewritten and rearranged, several new woods are included and more of the common names are given; (2) the lists of references and the general bibliography have been brought up to date; (3) an Appendix has been added which amplifies some of the subject matter of Part I, and also includes considerable new data on wood structure.

In grouping the woods in the Key more attention has been given to their general similarity than to special features, thus bringing together for effective contrast the kinds which are most likely to be confused in practice. Attempt has been made to

have all of the descriptions comparable and, so far as permissible to make the gross characters the basis for separation. The microscopic features are printed in smaller type than the others, to avoid confusion and to simplify the use of the Key.

It is comparatively easy to make a key for a given lot of wood specimens, but to take into account the range of variation of each wood is an extremely difficult task. Such a key must be the result of growth, of the accumulation of years of investigation and experience, and must always be subject to revision as new data and new material become available. To this end the author enlists the co-operation of all readers of this magazine.

Vacation Days in Colorado's National Forests. Issued by the Office of the District Forester, District 2, this recreation booklet is guaranteed to create a longing in the heart of every reader for "the hills, whence cometh our help." And nowhere in our wide and beautiful country is this desire more fully met than in the "Switzerland of America." The National Forests in Colorado hold an opportunity, and an invitation to those to whom the impulse comes to leave the heat of the city and business cares behind and follow the open road to the "still places." Nowhere else in the United States, and seldom in any land, may one look upon more majestic vistas of snow-capped mountain ranges, forested slopes, granite gorges, tumbling cascades and rolling plains than in these playgrounds of the people in Colorado. The climate is wonderful—a tonic of sunshine and pure air, filling one with vigor. Few places may be found which offer the seeker after rest, recreation and outdoor life so many opportunities for enjoyment. The booklet describes briefly the National Forests within the boundary of Colorado, stressing particularly points of interest and the privileges extended to prospective visitors and contains as well practical advice and information regarding camping outfits, personal equipment necessary, etc. Further information may be had by addressing District Forester, District 2, New Federal Building, Denver, Colorado.

ENTOMOLOGISTS of the United States Department of Agriculture who last fall began an examination of the cranberry bogs of Michigan, Wisconsin, and the Pacific Coast which have received shipments of cranberry vines from New England report that they find no evidence of gypsy-moth infestations from such shipments. It had been feared that the moth had been carried on the vines to the western bogs. Determination of the fact was necessary in order to know what control measures should be undertaken. In that connection the Department is making tests to determine both the resistance of cranberry vines to intensive fumigation and the strength of fumigation necessary to destroy the eggs of the gypsy moth.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF
FOREST ENGINEERS

The Laurentide Company, which was the pioneer in grinding hardwood for pulp in an experiment last fall, tried a further one this spring when seventy cords of mixed birch, beech and maple was barked in the drum barkers without any difficulty and ground into pulp. Owing to the irregularity of the four foot sticks barking with knife barkers was soon proved to be unsuccessful but the drum barkers removed the bark, if anything, a little more easily from the hardwood than from spruce, the only difficulty was the weight of the wood which is harder on the conveyors. Beginning in August the Company will begin to use hardwood continuously.

The meeting of the Woodlands Section of the Canadian Pulp and Paper Association took place on June 25 and 26. The first day was spent at the Berthier Nursery of the Provincial Government as the guests of Mr. Piche, Chief Forester. The Minister of Lands formally opened the air patrol and the seaplane arrived and left from Berthier for its first trip. The nursery was inspected and also the planting on drifting sands at Berthier and a fine stand of white pine which has been thinned and cared for for a number of years. There was also a general discussion of reforestation and slash disposal. The meeting on the next day was held at Grand Mere and Proulx where the nurseries and experimental plantations were inspected and where tractors were shown at work and a kerosene brush burner and gasoline fire pump demonstrated. An out door woodsman's lunch was served. A representative of the U. S. Forest Service was present and a large number of representative pulp and paper and lumbermen were present with a number of Government and private Canadian foresters.

Two trees affected with blister rust have been found in a plantation of Scotch pine planted by the Laurentide Company and have been removed and burned. The white pine weevil has also attacked the same plantation and a fungous disease which has destroyed some of the terminal buds. This latter is now over. If Scotch pine is going to suffer in this way it will hardly pay to plant it in this section.

Mr. H. G. Schanche, for many years with the Forestry Division of the Laurentide Company has become forester for the Abitibi Pulp and Paper Company, Ltd., of Iroquois Falls. They expect to start a nursery at once and begin reforestation on their cut-over lands.



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In the St. Maurice Valley two large fires have been extinguished without loss of merchantable timber but with a large area of cut-over land destroyed. In the earlier days when the areas of timber cut over each year by the various operators were small and widely separated the danger from the heaped up debris was not serious. Today, however, when an area of 126 square miles is being cut each year and when the operations of some of the companies are contiguous, a dry spell of eight or ten days and a high wind make such areas almost impossible to control and a terrible conflagration will be almost inevitable. The large number of men required to fight such fires makes them very expensive. The time has come when some Province-wide system of burning slash from lumbering must be inaugurated. Even if the cost should run to a dollar a cord, by being borne equally by all no hardship would be incurred and the cost would

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be borne by the consumers at large who are the real owners of the forests and who are most interested in their protection. Individual timber holders can cut off their timber, make a profit and go out of business, but the public cannot see their forests vanish. Wood we must have and the forests must be handled so as to perpetuate them.

The Province of Nova Scotia has decided to employ a Provincial Forester and thus complete the proper policy for the whole of the forested provinces of the Dominion.

The work of the Dominion Forestry Branch at the Petawawa Forest Reserve, under Mr. H. C. Wallin, in studying the growth, increment and so forth of the trees there will continue during the summer. Some valuable results were obtained last year and much is hoped from the research program now under way.

The Commission of Conservation in cooperation with the Laurentide Company, the Riordon Company, the Abitibi Company, the Province of New Brunswick and the Province of Quebec, will continue their research work under Dr. Howe into the growth, reproduction, mortality rate, etc., on cut-over pulpwood lands. The work will also be extended to burnt over country. Plots have been laid out and treated in various ways. For instance, one plot has been cut clean and the debris burned in piles, another cut-over and the debris allowed to lie and the hardwood trees have been girdled. On others every seedling is

tagged and numbered and the growth will be studied. An entomologist and an expert in fungous diseases are with the party and will look after their respective fields. At the Laurentide Company plantations of various trees on different soils and with different aspects have been made, also different mixtures of trees and mixtures of dominant and suppressed trees from the transplant beds. These will be measured and studied from year to year. Seed selection is also being practiced and Scotch pine of the second generation is already growing.

A DEPARTMENT OF FOREST RECREATION ESTABLISHED AT THE NEW YORK STATE COLLEGE OF FORESTRY

A NEW department, that of forest recreation, has just been established at the New York State College of Forestry. This department will assist in the development of the work of the College, both along investigational and instructional lines, in the proper uses of forest areas for public recreation purposes. The establishment of this department is in line with the endeavor of the College to make its work of real service to the people of the State and to increase the right use of forests and forest lands. This is the first department of forest recreation to be established in a school or college in this country.

With the great Adirondack and Catskill Forest Preserves, Palisades Interstate Park, Letchworth Park and some thirty other public forest reservations, the whole totaling nearly two million acres, New York State has unique forest resources, capable of securing to its millions of people great public good in the way of recreational uses. Just as playgrounds are being established in villages and cities throughout the country, where play may be organized and properly directed, so the forests of this and other States must be studied and developed, that they may be more effective playgrounds for the people of the State.

This new department of forest recreation in the College of Forestry will be in charge of Prof. Henry R. Francis, who has made a specialty of this line of work and who during the past five years has been carrying on landscape extension work both in New York and Massachusetts. During the coming summer Professor Francis will begin systematic studies of forest and park areas in New York to prepare bulletins for recreational development, and late in the season will make a trip through the national forests and national parks of the West to see what has already been done by the National Government and by the Western States in developing the recreational possibilities of forest lands.

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PLANTATIONS of the locust tree can be successfully protected from the borer and grown profitably on a commercial scale if the trees are planted in thick stands or mixed with other trees, so as to produce a densely shaded condition during the first ten to fifteen years. Investigations of the United States Department of Agriculture showed that more trees were destroyed by borers in tracts which had been pruned occasionally, or closely grazed, or in which fire had killed out the underbrush, thus destroying the natural shade produced by weeds and shrubbery.

The denser the underbrush about the trunks of the trees the less is the damage done by borers. Trees growing from two to three feet apart were seldom injured, while nearby isolated trees were riddled by borers.

Condition Necessary for Borer Attack

All trees and all parts of the tree are not subject in the same degree to attack by the borer. Rough bark provides crevices in which the borers deposit their eggs. Young trees, less than one and one-half to two inches at the base, are not attacked unless the bark is rough. On younger trees the borers are found at the base and near rough crotches. Trees with trunks more than five or six inches in diameter rarely contain the insects. On such trees the larger branches frequently are infested, but such injury is seldom common enough to do much harm. Protection from borers is necessary for only a comparatively short period during the tree's growth. Under good growing conditions this time should not exceed ten years.

Treatment of Shade Trees

The locust is widely planted for ornamental and shade purposes. It is highly desirable, because it grows readily in a variety of soils and situations. It grows rapidly and forms a shapely crown when planted in the open. But it is frequently attacked by borers. This is because shade trees are planted singly and in the open, thus furnishing favorable conditions for attack.

Young borers can be killed readily by the use of an arsenical spray. Spraying will be necessary only every two or three years, unless badly infested trees nearby are not treated. As a rule, spraying will not be needed after trees reach six inches in diameter. Trees of that size are usually immune from attack, but should be watched.

Locusts make such desirable shade trees that they should not be neglected and allowed to become injured or destroyed by borers. The increasing value of black or yellow locust for many purposes makes it a profitable tree to grow commercially and emphasizes the importance of protecting it from the borer. Information concerning the care of both shade trees and commercial plantings of locust is included in Bulletin 787, issued by the United States Department of Agriculture, Washington, D. C.

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AIRPLANE PATROL IN NATIONAL FORESTS

PATROL of national forests by Army airplanes to give early warning of fires developing in the forests began June 1, according to arrangements completed with the War Department by the Forest Service, United States Department of Agriculture. On the same day observations covering a large part of the Angeles National Forest were begun from a captive balloon stationed over the Army Balloon School near Arcadia, California.

Two routes of airplane patrol work will be operated from March Field, twelve miles southeast of Riverside, California. Two planes will be used on each route, the routes will each be approximately 100 miles long and each route will be covered twice a day.

This is the beginning of experimental work in which the adaptability of aircraft to forest patrol work is to be thoroughly tried out. If the tests prove successful it is expected that the airplane patrols will be extended before the end of the 1919 season, and that airplanes will become a permanent feature of the ceaseless battle against fires in the national forests.

The airplane routes from March Field will afford an opportunity to survey about 2,000 square miles in the Angeles and Cleveland National Forests. The airplanes are not equipped with wireless telephone apparatus of such a nature that they can communicate with the ground without the installation of expensive ground instruments. Warnings of fires will be transmitted by means of parachute messages dropped over a town, the finder to telephone them to the Forest Service; by special landings made to report by telephone, and by returning to the base and reporting from March Field direct to the forest supervisor. Fires will be located and reported by squares drawn on duplicate maps, one to be in the possession of each airplane observer and another to be in the office of the forest supervisor.

The observation balloon over the Arcadia Field is to be maintained at an elevation of about 3,000 feet from 7 A. M. until 2:30 P. M. each day. The student detachment learning observation now stationed at Mount Wilson will also render fire lookout service. Reports of fires from both the balloon observer and the Mount Wilson detachment will be telephoned to the Army Balloon School and transmitted to the Forest Service office at Los Angeles. A fire-fighting truck, with ten enlisted men, will be stationed at Arcadia as part of the fire-suppression forces and will be subject to the call of the Forest Service.

IN MANY sections of the national forests it has been found impossible, without great expense, to maintain telephone wires or cables because of the havoc wrought by timber falling across the wires and by heavy snowslides. Therefore, wireless tele-

phones are soon to be given a trial in the forests, and the Signal Corps of the Army has lent four combination sets of transmitting and receiving apparatus to the Forest Service of the United States Department of Agriculture.

Equipment is to be installed on Mount Hood, at an elevation of about 13,000 feet, and another set is to be at the nearest forest ranger station, about twelve miles away. Two other sets are to be placed in the Clearwater forest region of Idaho, which is heavy wilderness country.

Wireless telephones have never been tried in mountainous country, and interest centers in the results of the experiments, particularly in the effect on messages of high ridges between telephone stations. The Mount Hood experiment will show the practicability of talking from a high point to a low point, and the Clearwater forest experiment will demonstrate whether messages can be communicated from two points of about the same elevation but separated by mountains.

All the wireless stations will be established at lookout points, and will give warnings of fires developing in the forests, supplementing the regular facilities of the Forest Service.

A CREW of treeplanters at Albuquerque, New Mexico, is now working under the direction of the Forest Service planting Douglas fir and Engelmann spruce on the high, barren slopes of Santa Fe Baldy, in the Sangre de Cristo range, on the Santa Fe National Forest. A large number of trees were planted last year, and 40,000 more are now being planted.

These seedling trees were grown from the seed of native forest trees at the Gallinas forest nursery, where experiments have been conducted for several years by the Forest Service in the art of growing forest trees from seeds. The problem is a very difficult one, according to forest officials, owing to the many technical questions involved in the semi-domestication of wild tree species. These problems have now been solved, and the forest plantation on Santa Fe Baldy, as well as several other plantations in the region, have been successful, and conclusively prove that forest trees can be artificially grown in the southwest in spite of adverse climatic conditions.

After getting a three years' growth in the Gallinas nursery, forty thousand of the seedlings were transported on pack-horses, with great difficulty, nearly to the summit of Baldy early this spring, where they were buried in the snow until weather conditions became favorable for planting. With the unusually moist, cool season, forest officers are very hopeful that a large percentage of the seedlings will survive and grow into a heavy stand of valuable timber in the course of the next two centuries.

The work of growing the seedlings and starting the plantation has been carried out by Forest Examiner Herman Krauch.

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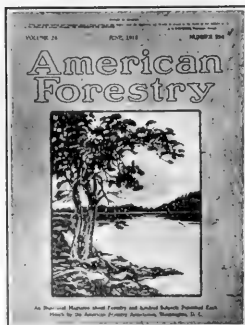
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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigation, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.



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American Forestry

WHAT SHALL WE DO ABOUT IT?

THE original forest area of the United States was 850 million acres.

THERE now remains, in virgin timber, about 230 million acres, about one-fourth the original area.

OUR total present acreage of forest and cut-over lands is about 500 million acres.

ONE hundred million acres of this is waste land which produces nothing, and 180 million acres more contain more or less second growth timber.

A LARGE percentage of this second growth timber is of inferior quality.

THE new growth of timber is not more than one-third of the amount which is being used or destroyed each year.



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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

AUGUST 1919 VOL. 25

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Photograph by courtesy Brown & Dawson, N. Y.

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THIS SCENE NEAR BOESINGHE, BELGIUM, INDICATES HOW THE GERMANS USED VAST QUANTITIES OF BELGIAN TIMBER IN BUILDING ROADS ON LOW GROUND. THE TREES STILL STANDING ARE DEAD, SHATTERED BY SHELL AND GUN FIRE.



THE CONDITION OF THE PARK OF A CHATEAU NEAR MORKEN, BELGIUM, AFTER EXTENSIVE TIMBER CUTTING BY THE GERMANS AND SOME SHELLFIRE. NOTHING LIVING IS LEFT STANDING.

AMERICAN FORESTRY

VOL. XXV

AUGUST, 1919

NO. 308

BELGIUM'S FORESTS BLIGHTED BY THE HUN

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

BRUSSELS, BELGIUM.

THE Germans practically destroyed the forests of Belgium during their four years' occupation of the conquered territory. A few small areas of wooded land still remain, but the trees are standing only because the Germans in their hurried retreat followed by their speedy acceptance of the armistice found insufficient time in which to complete their work of destruction.

Several hundred million dollars' worth of trees were destroyed, and the four provinces of Hainaut, Liege, Luxemburg and Namur suffered most severely.

Protests against the wholesale destruction of standing timber, and the deliberate damage of young growth so that it could not survive were made to General Baron von Bissing, Governor General of Belgium, by the Belgian Forest Administration and by the Central Forestry Society of Belgium, without avail, and the systematic and scientific destruction of the forests and woodlands continued during the entire period of the occupation.

Belgium's forest area, 1,299,450 acres constituted about 17% of the entire area of the country, whereas one-fourth of the German Empire and one-third

of Saxony, Bavaria, Wurtemberg and Baden is in forest. As Belgium is without doubt one of the heaviest lumber consuming nations of the world, in view of the density of her population and the needs of her industries, these German forests will undoubtedly be compelled to restore the lumber Belgium has lost, but only the long years can restore her forests. Meanwhile, the effect of changes of climate due to loss of her forests may cause damage impossible to estimate, to add to the many injuries already sustained by this unhappy country.

The situation is well expressed by a report of the Central Forestry Association of Belgium, of which Count Visart de Bocarme, the heroic Mayor of Bruges, is president, which says: "In 1914 the wind of Liberty still blew in the rich foliage of our forests, which were, alas!

soon to become acquainted with the axe of the vandals. For, during that dark period of fifty-two months, after committing every manner of crime, they also perpetrated the monstrous felony of laying low our forests; for let us remember that they have cut down several hundred millions worth of our trees.

"Everything went—venerable shade trees of the roadside, the parks, and the fields, elms and poplars; experimental trees, exotic or curious; historical trees; forest trees such as oaks, ash, beech, or of the orchard, such as walnut trees; massive growths of both deciduous and indeciduous varieties; forests belonging to the nation, to communes, to charitable institutions, or to private individuals; nothing was spared, old or young, tall timber or coppice wood, not even the bedding.

"They had set out to leave nothing standing when they were finally compelled to let go under the irresistible pressure of our victorious troops, and in some cases left their cutting unfinished."

Much was done by the Belgians during the four years in the effort to save some of the forests, to have the young growth protected even if the usable trees had to be sacrificed. Notes,

protests, appeals, supplications, were made to the German officials, but all without other result than curt refusals to modify the orders for steady and systematic destruction which were being issued from time to time.

To General Baron von Bissing was pointed out the fact, so familiar to every German officer, that a certain area of forest is absolutely essential to the prosperity and even the vitality of a nation, a truth put into application with jealous care in the various states of Germany. He was told that in Belgium for the last twenty-five or thirty years, the nation, the provinces, the communes, and numerous owners have united their efforts with a view to increasing the forested area, which was obviously insufficient, in view of the imperative needs of the nation in the way of timber, as well as out of consideration for

Belgium, eager for the restoration of her destroyed forests, has gratefully accepted the offer of the American Forestry Association to aid by presenting American forest tree seed. Belgium's director of forests, N. I. Crahay, has asked for quantities of the following seed:

NOBLE FIR, GRAND FIR, WHITE FIR, SILVER FIR, WESTERN LARCH, DOUGLAS FIR, PORT ORFORD CEDAR, BALD CYPRESS, TIDELAND SPRUCE, PIN OAK, RED OAK, SUGAR MAPLE, SILVER MAPLE AND TULIP POPLAR.

The American Forestry Association is now soliciting contributions to a fund to provide this seed and also to provide seed for the replanting of the devastated forests of France.

NEW YORK
BOTANICAL
GARDEN

the numerous and valuable indirect services which forests render from the standpoint of climate, water supply, etc.

It was also indicated that the forests were young and of recent creation, and their yield of lumber as well as their general output comparatively small, for the area of mere coppice wood and of timber of small value or utility constituted about one-fourth of the whole.

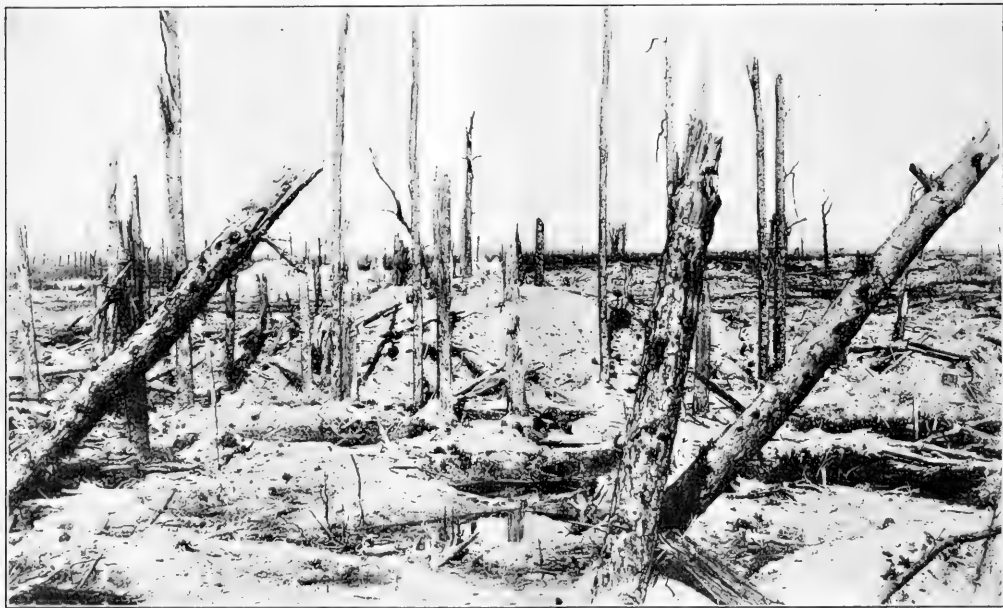
Numerous plantations had been established, some in order to protect regions against dominating or drying winds, others for the sake of clothing hills and elevated plateaus with a view to preventing disastrous overflows of water courses which prevailed prior to the establishment of these plantations. The removal of these woods which served as a defense against the elements would cause not only considerable losses but even a public

stipulations of the international convention signed at The Hague on October 18, 1907.

"As a matter of fact, as regards the Government forests, article 55 of this convention provides that the occupying Nation shall be considered only as an administrator and usufructuary of this property and shall be obliged to administer it in accordance with the rules on usufruct.

"Now, the exploitation of these forests is regulated according to the Belgian laws on the basis of methodical arrangements which determine the areas and amounts to be cut annually.

"As regards the forests of communes and of private parties, article 52 stipulates particularly that requisitions in kind shall be made against communes and inhabitants only for the needs of the army of occupation.



SUCH SCENES AS THIS IN BELGIAN FORESTS AND WOODLANDS ARE NOT UNUSUAL. THERE ARE SCORES AND SCORES LIKE THIS AND WORSE. THE DIFFICULTY OF THE PROBLEM OF RESTORATION IS APPARENT AT A GLANCE.

danger as a result of the probable inundations, not only in Belgium but even in Holland, if, for instance, the hills of the basin of the Meuse and its affluents were stripped. It would certainly provoke legitimate protests on the part of the injured owners, who would find their crops reduced in consequence of the absence of the shelters which protected them, or ravaged by the torrents which would be sure to arise following the denudation of the hillsides.

The Forestry Society even pointed out that the stipulations of the international convention signed at The Hague protected the forests of occupied enemy territory, and said in an appeal to Von Bissing:

"We are compelled to protest against the seizure of our forests, all the more energetically because we consider ourselves protected in this highly grave matter by the

"Now, it does not seem to us possible that the army of occupation alone could use the large quantities of wild pine, spruce, beech, oak, and walnut that have been cut down, taken out, and seized by the German military authority.

"The same article also stipulates that these requisitions shall be in proportion to the resources of the country and of such a nature as not to impose upon the population the obligation of taking part in the operations of the war against their own country.

"Now, according to the considerations set forth above, we are convinced that the timber that is now being taken is out of all proportion to the extremely limited timber resources of Belgium, which are already exceeded by the needs of the natives."



A WOODLAND NEAR MERCKEN IN BELGIUM, SHOWING THE REMAINS OF WHAT WAS ONCE A ROAD RUNNING THROUGH THE MIDDLE OF THE PHOTOGRAPH. WOODLANDS IN THE DISTANCE WERE SAVED DOUBTLESS BECAUSE IT WAS TOO DIFFICULT TO GET OUT THE TIMBER.

The effect of this protest may readily be guessed. Von Bissing, in a brief note, replied that the explanations could not induce him to revoke or modify the measures taken, and added that the cuttings were on so small an area that "it is impossible for any of the injuries which you fear to occur." The Forestry Society comment on this was:

"Let us merely say that it is a wonder that its author did not say that not only have we no injury to fear but that these cuttings were ordered in the interests of our

people and of our forests." The Belgians, still brave, still hopeful, still deeply concerned, endeavored by submitting forceful statistics on the situation to Von Bissing to secure some modification of the campaign of destruction. This was sent him:

"We see there that the total area of *indeciduous* forest in the kingdom is 424,150 acres, divided into 138,685 acres under the forestry administration and 285,465 acres belonging to private parties.

"The sale price of the exhaustive cuttings in the inde-



LE BOIS DES LUPINS, NEAR ROESINGHE, BELGIUM, SHOWING THE EFFECT OF HEAVY SHELLFIRE ON THE GROUND AND ON THE TREES. SUCH DAMAGE EXISTS FOR A WIDE AREA IN THIS SECTION.



THE PARK OF A BELGIAN ESTATE OCCUPIED BY THE GERMANS. HERE TIMBER WAS CUT AND PRACTICALLY ALL OF THE UNCUT TREES WERE KILLED BY FIRE AND SHELLS. MANY OF THE FINE PARK LANDS OF BELGIUM ARE IN A SIMILAR CONDITION.

ciduous forests under the forestry administration having been 577,419 francs in 1910, we can infer from this that, for the total area of indeciduous forests, the proceeds of the exhaustive cuttings amounted in 1910 to approximately 1,765,165 francs, representing a total volume of 126,083 cubic meters.

"According to the same data we find that in 1910, in regard to the provinces of Hainaut, Liege, Luxemburg, and Namur, as referred to in Your Excellency's answer, the area of indeciduous forests is 204,158 acres, the proceeds from exhaustive cuttings 859,615 francs, and the volume exploited 61,401 square meters.

"The revenues of the preceding years are practically the same as those of 1910, and may be considered as normal and as representing the maximum yield.

"Now, Your Excellency writes us that, according to anticipations, the cuttings of indeciduous timber will not exceed an area of 4,940 acres in these four provinces.

"This area will be taken from the growths offering the heaviest dimensions and representing a present value of 12,500,000 francs at the least.

"This quantity therefore considerably exceeds not only the maximum yield of the four provinces contemplated, of which we did not even deduct the forests comprised in the line-of-communications zone, but it also exceeds that of the whole country.

"Under these circumstances, and inasmuch as it has already been necessary, for the needs of the Nation under present conditions, to dig deeply for the last two years into our forest reserve by means of extraordinary cuttings, it is to be foreseen that, through the fellings con-

templated, the resinous lumber resources of Belgium will be reduced beyond all proportion, if indeed they are not exhausted completely for the years to follow."

To this Von Bissing, evidently short of arguments and without doubt somewhat peeved, said he was familiar with the statistics and "I cannot deduce therefrom any reason for suspending or modifying my instructions."

There was nothing further to be done. The cutting of usable trees and the destruction of the young growth continued.

The damage done to the various forests is indicated in the following reports of the Forestry Society now available:

"The operations of the occupying nation had begun—one must break one's hand in in all things—by cutting down the resinous trees. As early as July 7, 1916, we were informed of the seizure of the resinous forests belonging notably to the communes of Chimay and Forges, to Mr. F. Brugmann in the territory of Escailleire and of the Riezies, and to Mr. Ch. Malengreau in the commune of Macquenoise.

"The exploitation of the spruces on the Revers d'Oise and in Fagne, the two cantons belonging to the city of Chimay, and that of the wild pines, in the commune of Forges, was carried out quickly; the case was the same with wild pines about sixty years old, planted as tall sentinels at the entrance of the oak groves of the commune of Salles and in regard to which they already dispensed with the formality of sending a notice of seizure. This latter cutting was exploited at the end of September, 1916; it was the same way with some spruces which the

communes of Seloignes and Forges-Philippe owned on one of the heights of their forests of Thierarche.

"It took more time to fell the splendid mass of spruces of the Hauts-Marais. This forest was assuredly the most beautiful of this kind that existed in Belgium, great spruces planted about 1862 and whose spires seemed to reach the sky in the darkness which their thick branches left on the ground. This beautiful mass no longer exists; all the spruces, and with them large quantities of trees which grew in the forest proper, along walks and borders, all have disappeared for the satisfaction of the needs of the occupier, who never cared, of course, to indemnify the owner. What is more, for we can never get done telling the misdeeds of the Germans in Belgium, groups of exotic trees such as Japanese larches, Douglas firs, etc., remarkable for their vigor and their dimensions, found no more mercy before the axe of the vandals than did the ordinary spruces.

"At the same time there were being exploited in Thierarche, on the territory of Macquenoise, pine woods mixed with birch. The Germans had constructed a Decauville railroad in order to transport the timber to the railroad station at Momignies. On this track was a wheezy locomotive pulling a car which contained at most one and one-half cubic meters of wood; and good people, good Belgians at that, were nevertheless admiring the spirit of organization of the usurpers!

"The quantity of oaks concentrated in the forests of the Chimay region and the situation of the forested areas with respect to the railroad stations adapted to the German enterprises, are likewise the reasons why the

Thierarche forests had to suffer worse than those of Fagne.

"In view of the stoppage of business the greater part of the communes had failed to sell the oaks of the cuttings of 1915 and following. On the contrary all the white wood, which is suited to the manufacture of wooden shoes—the only local industry that kept up during the war—all the white wood had been sold as soon as the exploitation of the copse had permitted operations of timber selection. This was in fact all timber saved from the break-up and turned over to Belgian industry for the consumption of the interior of the country, but it was necessary to be disillusioned soon on this point also with respect to the honesty of our adversaries.

"The high oak forests of Bourlers and Forges were attacked first; while the felling of communal forests took place in violation of all rights and conventions. We must recognize that here at least the frenzied desire to injure and destroy the forest, to wipe out the forest reserve and all resources for the future, this bad desire, we will say, does not appear. Only the larger trees fell, and enough others were preserved so that the forest still has the appearance of high timber over a thin copse. However, all the big oaks are felled; as a matter of fact, they constitute the bulk of the value.

"While matters did not transpire so badly for these two communes, it was different with others, whose misfortunes we shall recite.

"The forest of Monceau-Imbrechies, traversed from south to north by the road from Monceau to Seloignes, reached the facilities of the Seloignes-Monceau railroad



STURDY TREES IN A PARK IN BELGIUM WHICH SUSTAINED HEAVY SHELL AND MACHINE GUN FIRE AND STILL STAND, SKELETON DEAD, FILLED WITH BULLETS AND SHRAPNEL SCRAP.

station. It was one of the richest forests in the region, well served by two metaled roads, and situated between the railroad station and the locality which comprises many makers of wooden shoes, all being circumstances which gave value to the various classes of timber. Its big oaks, while not all of excellent quality, were known far and wide and offered dimensions little known elsewhere. One of these veterans measured 13¾ feet at a height of five feet, and was 53 feet high; it was named the Big Benefit Oak. Individuals from 6 feet to 8 feet in diameter were common there, those measuring from 8 feet to 11 feet were not rare, and there were several gauging 11 feet and over. Groups of beeches, modern and ancient, were met with and distinguished themselves by an exceedingly

"The forest of Imprechies, a section of the same commune, was cut to the ground, or almost; it was stocked with about the same growth as that of Monceau, though a little less rich in big trees.

"The commune of Beauwelz owned high timber on copse, less thickly planted than the Monceau forests. Of all the oaks, beeches, birches, and maples nothing is left over almost the whole area. The "Decauville" railroad, constructed for the transportation of the resinous timber of the private forest, seems to have helped to consummate the ruin of the forest; the trees were felled there in the copses of all ages, from six to eighteen years! The birches and other timber that could be used in manufacturing wooden shoes and for which the industry was



ALL THAT IS LEFT OF A BELGIAN WOOD OCCUPIED BY BRITISH TROOPS WHEN THIS PHOTOGRAPH WAS TAKEN AFTER THE ARMISTICE. IT IS THE BOIS TRIANGULAIRE, NEAR MERCKEN. ALL THE SKELETON TREES STANDING ARE DEAD. THE YOUNG GROWTH IS UTTERLY DESTROYED.

rapid growth. Tall birches and big sycamore maples completed this fine high-timber forest.

"To this forest were given the names of Tailles Andre, Benefice, Richots, Mauvais Pas, and Atelier; the cuttings dated from 1906 to 1917. Apart from the high timber, everything has disappeared: Secular oaks, groups of imposing beeches, tall birches, big maples, rooted saplings, staddles, moderns, ancients, superancients, young cadets, tall timber of young cuttings, reserves of middle age stature and old exploitations, everything was chopped down to within 20 inches of the ground, and dragged through copses of all ages to the roads by the pitiless cable actuated by a tractor. The copse is broken up, crushed, distorted, and destroyed.

paying at the time at the rate of 70 francs per actual cubic meter, were cut down at the same time as the oaks, being cut up into logs for use in heating the fire boxes of the tractors and locomotives.

"The Germans have ruined the commune of Beauwelz, and the indemnities the latter may be able to collect will not restore to it its forest wealth, which has hitherto been the uninterrupted source of its revenues, of wages for its woodsmen, and of raw materials for its makers of wooden shoes, all of which are factors of exchange and benefit to the whole locality.

"These two communes have been hit harder than the others. Beauwelz was able some twenty years ago to escape inroads on its timber supply such as had been



CONDITION OF A WOODLAND NEAR MERCKEN, BELGIUM, SHOWING HOW THE DESTRUCTION OF TIMBER AND DAMAGE BY HEAVY SHELLFIRE HAS TURNED FINE WOODLAND NEAR A WATERWAY INTO A SWAMP.



ANOTHER VIEW OF WOODLAND DESTRUCTION NEAR MERCKEN, BELGIUM. NOTE THE SHATTERED TIMBER LYING IN AND NEAR THE SHELL HOLES. RESTORATION OF LAND AS BADLY DAMAGED AS THIS IS WILL BE A TEDIOUS AND COSTLY WORK.



THE BOIS CHARPENTIER NEAR BISCHOOOTE, IN BELGIUM, IS A SCENE OF UTTER DESOLATION. THE FOREST VALUE OF THE LAND HAS GONE AND IT IS A WATER-SOAKED, MUD-COVERED AREA MARKED BY NUMEROUS SHELL HOLES.

caused elsewhere by the assessment of the "usage duties" of the old principality of Chimay; as a matter of fact, it bought all the trees which were to be sold for the benefit of the Prince of Chimay. The commune of Monceau-Imbrechies was also reputed to have considerable savings. The Germans knew the smallest details of our affairs and we should not be at all surprised if they were aware of the financial situation of these two communes; they, who were fighting for justice (?), could it have been that they wanted their operations to bring about equi-

librium in the forest wealth of our communes of Thierarche?" These reports do not cover the whole area of destroyed forests, facts about which are now being gathered and which will later be printed. A brief examination, however, of any of the destroyed forests indicates very clearly the truthfulness of the Belgian comment in summing up their losses: "Such is the work of the Germans, of professionals, for it appears that it was professional foresters who were charged with designing and directing these henceforth famous exploitations."



A SCENE IN THE BOIS DES LUPINS NEAR BOESINGHE, SHOWING THE GERMAN FORTIFICATIONS AND THE DESTRUCTION DONE TO TREES AND FORTIFICATIONS BY SHELL FIRE.

THE NORTHWEST'S WORST FOREST FIRES

AS this issue of American Forestry goes to press, the reports regarding the forest fires now raging in the Northwest show a situation of extreme gravity. The conditions are probably the worst ever faced in that region. The third and worst of three successive years of severe drouth has parched the country. High winds, heat, and electric storms, bringing lightning without rain, have heightened the peril. There are probably more fires burning uncontrolled at the moment of writing than have ever been known since organized protection of the forests began. Twenty-five hundred men are on the fire lines in the National Forests, and the entire available surplus of labor in Northern Idaho and Western Montana has been gathered up by the Forest Service, and is not enough.

The worst fire year of recorded history, from the standpoint of losses, in the same region was that of 1910. The great conflagration of that year began after the middle of August. Normally, conditions grow worse and worse until early September brings the beginning of the fall rains.

What may come this year no man can tell. If an appalling disaster is escaped, it will be due in part to good fortune. At the best, there will be very heavy losses of property. The situation may any day reach a point at which the organized forces which are trying to hold the fires in check will be routed and put to flight before a vast and resistless, hurricane-driven sheet of flame. The Forest Service admits that already, though straining every nerve, it is having to give ground before some of the fires, seeking not their control but merely to limit, in so far as possible, their destructiveness by directing their course where they will do least harm.

To know accurately what is taking place in a battle is proverbially difficult until the smoke clears away. With great forest fires a similar situation is created. It is unfortunate, but inevitable, that just now when spectacular losses are again directing public attention to the great need of better protection against these fires, it is impossible to make out fully why the efforts to control them have not been more successful. That can only be told when all the details can be studied and analyzed. Nevertheless, certain undeniable facts stand out.

In 1910 the same region was swept by fires so widespread and devastating that it was hoped their record would stand unique for all time. The Forest Service met the situation heroically. Confronted with conditions the like of which it had never faced before, it won universal commendation for the fight which it put up against great odds. In the light of the experience then gained it developed new methods and improved its organization. It also sought from Congress larger authority to incur expenses in future emergencies of the same nature.

The next year Congress provided an extraordinary emergency fund of \$1,000,000. As the immediately following years happened to be exceptionally favorable

this fund was cut, over the protest of the Forest Service, to \$200,000 for the fiscal years 1913 and 1914, and to \$100,000 for 1915, after which it was eliminated entirely.

Again and again the Forest Service has been embarrassed by delays in the enactment of the agricultural appropriation act until after the beginning of the fiscal year on July 1. In 1912 the bill became law August 10; in 1916, August 11; in 1918, October 1. In each of these years a "continuing resolution" made available in the interim at the rate of one-twelfth the previous year's appropriation each month. Since the heaviest expenditures of the Forest Service and the fire season fall in the summer months, the method is obviously inadequate. Through what shifts and devices the fire fighters have been employed, transported, equipped and fed this year because of delay can only be surmised, but very serious responsibilities must have been assumed and formidable embarrassments surmounted. The remedy is simple. Let Congress re-enact the million-dollar extraordinary emergency provision and make the fund available until the next year's appropriations can be drawn on. What is not needed will not be spent, but will revert to the Treasury. Public opinion should demand that this appropriation be made.

It is also plain that the fund for co-operation with the States in forest fire protection should be largely augmented. The total is now \$100,000, apportioned among 24 States. Montana's allotment from this fund for the current year is \$3,000 and Idaho's \$4,500. The figures speak for themselves.

Further, it is imperative that radical measures be adopted to provide adequate salaries for Forest officers commensurate with the character of their responsibilities and with what private business enterprises are glad to pay the same men. The Forest Service is being starved out. Many men have left because they could not stand the economic pressure. In consequence green men have had to be put in where experience was of great importance. Repeated efforts of the Forester to secure more adequate pay for his field force have been without avail.

Finally, a more vigorous and determined public demand that forest fires throughout the country must be done away with, as nearly as this is humanly possible, must arise and find effective expression. Forest fires have become an anachronism. They belong to a heedless and unenlightened age in the matter of forest conservation. They must be fought on a nation-wide scale by private owners, the States and the Federal Government in co-operation. Protection of forests, including young growth, against fires must be made compulsory in all forest regions. Efficient methods must be developed under public leadership. Competent men must be employed by the States and the nation, and politics must not be allowed to make their work ineffective. The time for indifference and neglect is past. If our lawmakers fail to recognize the fact they may have cause to regret it.

PREVENTION OF FOREST FIRE LOSSES

BY SMITH RILEY

IT is well known the world over that America of all nations is careless with fire and although her equipment for suppression is of the finest, our yearly losses from fire are enormous when compared with other nations. The explanation of this would seem to be a lack of thoroughness in adopting and practicing methods of fire prevention. Does this failure come from the typical American haste in doing all things? Is it that in our construction work we are in such haste to arrive at completion we cannot take proper precautions to prevent loss from fire? Or is it that the ease with which property is gained and insured makes one careless whether it is destroyed by fire or some other way?

It is interesting to follow this line of thought in relation to forest fires doing enormous damage each year. These fires are from two causes, namely: Those started by man, and those started by lightning. A campaign of prevention should lessen and gradually eliminate a large part of loss from the first cause, while a policy of suppression must be applied to lightning caused fires. Lack of realization of the damage created by fire is certainly responsible for the greatest loss by man-made fires and it is quite interesting to note the gradual decrease in forest loss in those regions where progress has been made in educating the public to the necessity of care with fire to prevent such loss. The most effective way of doing this seems to be the forcible bringing home of the realization, by drastic measures, of the losses by fire and the need for cautious use of this element.

In New York State the action of the Conservation Commission in forcing the railroads to burn oil in engines running over all forest roads during the fire season has been a big step towards public realization

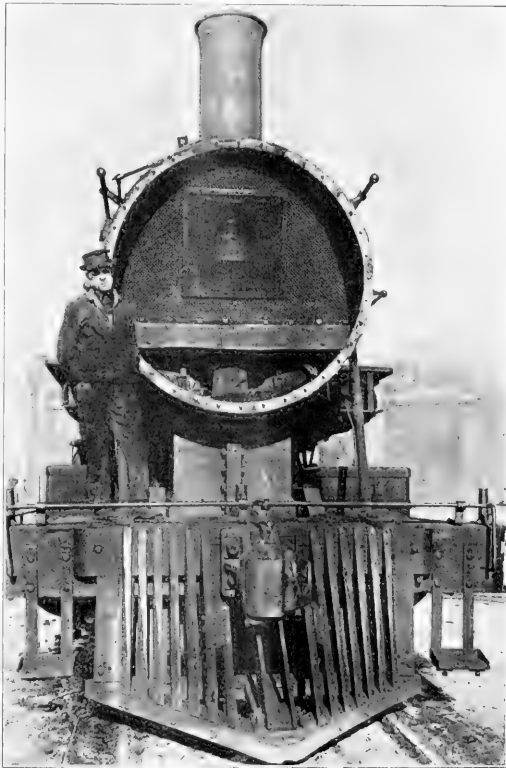
of the necessity for fire prevention. In South Dakota the most has been accomplished by a suit against a railroad that caused a big loss by forest fire.

Where the campaign for prevention has followed the principle of emphasizing the necessity of extreme care in any use of fire and the damage resulting to all forms of forest growth by its promiscuous use, much

greater progress has been made towards a realization of need for public care in its use. In Minnesota recognition is given to the policy of spring burning of logging slashes, which amounts to nothing more than setting out fire in such areas as soon as it will run in the spring and letting it burn. From a vantage point in the forested region one may count a dozen or more such fires when the season is on. There is no question that this promiscuous use of fire does much to deaden the realization of the damage done by fires and the public realization of the necessity of caution in fire use or the need of prompt action to stamp out fires gaining headway in dangerous seasons of the year. A public, understanding that fires are purposely set which destroy forest growth, is not going to be very keen in responding to a policy of putting out fires that may be burning this same type of forest growth. I feel sure the

present losses and the lax attitude of the public toward this loss will continue in Minnesota wherever the present policy of spring burning is allowed to continue in a wholesale way.

There is, therefore, a much keener realization of need for caution where fire is not promiscuously used and I feel sure that the problems of protection against fire loss will grow less and be solved with much greater promptness where the burning over of forest land is considered detrimental to the highest degree unless



AN EFFECTIVE MEASURE OF FIRE PREVENTION

This is a form of spark arrester which has been employed with good effect on locomotives in Colorado.



AND THIS DESTRUCTION MIGHT HAVE BEEN AVOIDED

This shows one of the many fires in the Black Hills Forest of South Dakota started by locomotive sparks before the employment of oil burning engines on all lines running through the forest.

complete control is demonstrated as necessary and put into effect when such burning is done.

While much remains to be done, what has so far been accomplished in gaining public recognition of the proper weight to be given fire losses is very gratifying. Railroad companies are realizing the necessity of placing a value upon all trees from the largest to the smallest. A fire was recently reported near a railroad right of way. The railroad company's claim agents were sent to the area at once with instructions to ascertain whether the company was responsible for the fire, and, if so, to appraise the damage and offer to settle. In a recent juvenile court case, two boys convicted of leaving a camp fire burning were sentenced by the judge to take a two weeks' trip into the forest to study a burned area and report fully to the judge the damage done.

The public when brought to a proper realization of the losses caused by fires and the need of care and prompt action for fire prevention and suppression, may become a fighting machine of the most effective kind. A fire starts; the individual who first sees it thereby acquires the responsibility of putting it out and, if this is not possible, of securing assistance promptly. Everything should be learned about the origin of the fire which is possible, so its cause may be fully understood. The man first upon the ground is in the best position to gain available information.

There is attractive excitement in answering the call to fight fire. A man who has answered this call once will always feel a quickening of the pulse and a desire to act when the call comes again. The need for quick action regardless of the hour, the necessity of matching one's wits against existing difficulties to secure imme-

diately action to control the element that is steadily destroying values it has taken years to create, brings a quickening of the pulse somewhat akin to that caused by a call for war. There is a big fire in one of the forests and an extra supply of equipment is needed. A wire has been sent to the district office for these things. The wire is received at 10.30 P. M. The next train upon which these things can be shipped leaves at 2.30 A. M. The first thing is to secure a conveyance and assistance, get into the supply room, pack the needed supplies, rush them to the station and express them out. Here is a piece of work that has in it only keen zest for matching one's wits against obstacles and not fail to fulfill the work of fire fighting

for which one has been made responsible by the receipt of the telegram. A man who has been a ranger for



CATCHING IT IN GOOD TIME

This shows Mexican section hands putting out a fire started by a locomotive crossing the Pike National Forest

many years said the one thing he regretted in leaving his position was losing the exhilarating excitement of going to and participating in controlling forest fires.

Efficient organization is important because every man who answers to the call for fire fighting, and is well treated, that is, well transported, well fed and bedded, will respond with zest to the work. Even a lazy man will feel a quickening of the pulse when he hears the call, like the dog and the child in the street when the fire engine goes dashing by. Prompt pay and good treatment are important factors that will in time make every man within striking distance a fire fighter to be depended upon. Here is a garage in a small mountain town crowded with people in summer. Many men are employed in this garage when the season is on and a line of cars is run, by the company owning it, through the forest to the nearest railroad point. The administration is charged with the

work of keeping fires out of the timber and the beauty of the forest growth along this road is of high value to the transportation company, so an agreement is entered into between the transportation company and the

forest administration providing that the drivers of all cars upon the road will keep their eyes open and report any fires noticed. When the report of an existing fire is received at the garage, fire tools furnished by the Government are loaded into a car and a number of men working in the garage are whirled away to the fire. The company is paid for the time of its men and cars. One who has seen the faces of these men on the road when they have been suddenly taken away from the mechanical work of the garage and speeded

into the open to fight fire, will understand the thrill of it. Efficient treatment must follow, else the men who respond will lose the zest of it. When the National Forests were first created there was no provision for



BURNED OVER AREA—THE ECHO RIVER FIRE

A public understanding that fires are purposely set which destroy forest growth is not going to be very keen in responding to appeals for fire protective measures and necessary control work, and must be educated to it.



HARD-WON REST FOR THE CREW

This shows the fighters at the Camp Creek Fire on day "sleep shift" near the burning fire line. Utterly exhausted, they roll up in their blankets and "tear it off."

paying except by check from Washington and those working upon a fire would have to wait a month or six weeks for their pay. It was not uncommon in those days, in calling a man to fight fire, to be told he would not go because it took too long to receive the pay. Here is different example: A bank cashier staying with some friends in the mountains, was asked by the forest ranger to help with a fire. He did so and worked at it all day. The check he received for his work was to him a souvenir of a novel and exciting experience. In the future, should this man be in reach of a forest fire alarm and be available, he will respond just for the excitement of it.

I have been told one loses his enthusiasm after fighting fire for a day or so; that the forest rangers in sections where the fire seasons are long and intense, become so wearied they dread to answer the telephone for fear the message may be of a fire requiring mammoth exertion. It is true that when

the body is weary, enthusiasm lags, but where the seed has been effectively planted, a period of rest will work a complete change as one's enthusiasm comes again to the front. Those rangers at the beginning of the fire

season are keen and enthusiastic. When they become weary by overexertion, give them a rest of a week or so and see what a change for the better will take place. This element of thrill is a real factor; it pays well to cultivate it in all classes of men. The response will come from those who delight in action and the attraction will be the zest of matching one's energies against an element of destruction beyond control. Efficiency in management,

such as good and prompt pay, transportation, good food and bedding, leaves the way clear to develop this enthusiasm, whereas poor management in any one of these things would tend to obstruct or lessen this enthusiasm.



WHEN THE GHOST WALKED

Here we see the forest officers paying off fire fighters at the termination of the work.



FOR THE COMFORT OF THE INNER MAN

This shows the thorough and methodical arrangement of the kitchen, and commissary established near the fire line for the service of the men who are fighting the fire.

FOREST DESTRUCTION PREVENTED BY CONTROL OF SURFACE FIRES

BY JOSEPH A. KITTS

FOREST fires in the United States destroy, year by year, more than the forest yield. It requires at least 250 years for a forest to reproduce itself, *i. e.*, the yield is not greater than two-fifths of one per cent per annum. The stand of timber is being cut at the rate of $3\frac{1}{2}$ per cent per annum. It is evident that we must save the yield and augment natural reproduction by planting, in order to insure a future supply. The situation is now so critical that the fire problem is one to which earnest thought and attention should be given until a solution has been proven, accepted and put into practice throughout the United States.

Forest fires are of three types in effect—surface fires which spread over the surface of the forest floor, fed by the litter; ground fires which smolder in the ground, consuming the humus and sometimes the roots of trees; and crown fires which destroy the entire forest cover. Crown fires start from the ground and the litter must be very heavy and very dry and inflammable to cause and sustain them. The humus must be very dry to sustain a ground fire.

I have practiced for the past twenty-eight years, on my home lands in California, a method of prevention of crown fires learned from the Sierra Nevada Indians. I have found this method successful in my second growth timber and also in prime forest where the accumulation of litter (the cause of destructive fires) was in considerable proportion. This method has been highly satisfactory from every point of view and is here offered as a solution of the fire problem in the coniferous forests.

The method consists in the burning of the forest litter, by surface fire control as described herein, during and at the end of the wet season, burning over by rotation from one-fiftieth to one-fifth of the forest area each year, the periodical rotation depending upon the local rate of litter accumulation. The litter is then burned without danger from crown or ground fires and, if handled scientifically, aids natural reproduction, removes the excess underbrush, increases the forage, maintains the forest in a thrifty and healthy condition and renders the forest immune to destruction by fire at all seasons of the year.

It is well known that the Indians practiced a periodic burning over of the forests. Literature on the subject has explained this in many ways excepting the one here given. When the California pioneer asked the Indian why he set so many fires, he replied, "Letum go too long—get too hot—killum all." He used the surface fire to burn the litter in order to prevent the crown fire which destroyed everything. He may not have been very scientific but it must be admitted that his methods of preservation of the forests were highly successful when compared with present day destruction. The first

growth trees are fire-marked throughout the northern Sierra Nevada forests; the indications of destruction by crown fires prior to the coming of the "Americans" are in small proportion and so indistinct as to point to fires very remotely in the past, if at all; and, the ages of the prime trees precludes the occurrence of crown fires for hundreds and thousands of years of aboriginal treatment. The pioneers found these forests open and clean; today they are so encumbered with fallen trees, underbrush and other litter that complete destruction is the usual result of a summer fire.

Consider the fires in the Crater Lake National Forest in 1910. (Forest Service—Bulletin 100). This forest has an area of 1,166,600 acres, an estimated total stand of 10,197,000,000 feet B. M. and a rated annual yield of 90,000,000 feet B. M. 60,891 acres, or 1-19 of the total area, was burned over, destroying 250,000,000 feet B. M., or 1-40 of the stand of timber. One thousand men, employed in fighting the fires, were found inadequate and five companies of United States troops were added. The cost of fire fighting to the Forest Service was \$40,000, or 70 cents per acre for the area destroyed. One thousand acres of the burned-over area was reseeded at a cost of \$3.00 per acre. The loss, then, cannot be estimated at less than \$3.70 per acre. The timber destroyed was three times the annual growth, and, although the year 1910 was an unusually dry one, it must be remembered that the average annual destruction, throughout the United States, is greater than the rate of growth.

I recently had an opportunity to study the densely planted forests of France. It should be observed here that without these planted forests France could not have waged war for four years. Crown fires are unknown in these dense forests because the people gather the litter for fuel. It is not possible, of course, for us to go fagoting through our forests and we must dispose of the litter in some other manner.

We use the backfire to remove the litter in order to stop a crown fire, and under most adverse circumstances. When the crown fire reaches the area backfired the live trees alone will not sustain it and it is stopped. Even in the drouth of summer, the backfire does little or no harm to the live trees. When the backfire is used to stop a crown fire, it only limits the destruction; it may be used in the spring to prevent it. The backfire is a controlled surface fire working against the wind, which prevents it from becoming a crown fire.

The following rules for surface fire control may be safely used by any engineer or forester experienced in forest fire fighting:

1. Burn the forest litter, by means of surface fires, during and at the end of the wet season, in intervals of

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UNCLE SAM, LUMBERMAN, CANAL ZONE

BY W. H. BABBITT

I DO not believe that it is very generally known that the United States Government is in the lumber business, actually operates a saw-mill, maintains lumber yards, sales department and all of the other establishments that go with the business. This is, nevertheless, a fact. The operation is on the Panama Canal Zone. The radical departure from the general policy of the Government is, I believe, likely to be of interest to American timbermen, and as the operations are being carried on in a new or little known field, the results obtained should also be of much interest. I hope my effort to impart these facts may not be too severely dealt with, if I also attempt to sketch in a little of the local color and a few of the human heart throbs, to lighten the otherwise heavy duty of the self-appointed historian.

The business is a child of the war and was brought into being to supplant, as far as possible, by use of native species, lumber imported from the States, and thereby release shipping for war purposes. One may wonder, if not conversant with the facts, why, when the canal is dug and duly operating, any great shipments of lumber were required. One look at the machine shops, dry docks, foundries, etc., necessary to the maintenance of locks, dredges, lighters and tugs of the operative departments of the canal where ships are repaired, or even built complete, or at the extensive car shops, where the rolling stock for the Alaskan railroads is being made up from old canal equipment, together with orders for foreign service and for the States, should be sufficient to convince one that raw material in quantity is, and will be, constantly required.

Many millions of feet of lumber had to be cut to entirely supplant the shipments from the States. Could

it be done? Well possibly, yes. There was machinery and men enough, but what about the timber? When garnered together from near and far, the facts were by no means imposing. It was known that the local forest contained trees that could be cut into sawlogs. Some of these trees had even been sawed up on a little resaw rig

prior to the birth of the new industry and furniture woods such as coco bolo, nazareno, mahogany and Spanish cedar of the cigar box variety, had been logged from the Zone since the old French days, and there it ended, for while saw-mills are plentiful on both coasts of Central America, none of them have ever cut commercial lumber, nor been successful in selling what they have cut, and from the point of view of a practical lumberman, the field was, and is, an entirely new one.

The mill itself is not too imposing, a thirty-five foot band saw intended originally for resaw work in ship construction, on which the edging is also done, and a trimming and slab saw. The entire rig occupies a corner of the large planing shop, but it is gradually, like the camel of the fable, pushing the original machinery out into the open. Roll ways were built to receive the logs, since most of the timber was expected to be of floating hardwoods and a pond would not only be nearly useless, but would unduly excite the sanitary contingent, a power to be reckoned with on

the Zone. Please note that the first lesson to be learned by a newcomer, upon landing in the Isthmus, is to let sleeping dogs lie, for be it known that the ways of our Uncle Samuel are passing strange to the uninitiated.

Dry kilns were also built and so was a burner to take care of the slabs. A logging camp was established on Gatun Lake and those in charge of it had the double duty



SHOWING DETAIL OF THE PECULIAR BARK OF THE LIGNUM VITÆ

The wood is close-grained, heavy and very hard, and the tree, with its richly colored dark green leaves, its blue flowers and orange-red fruits, is in striking contrast to its arid surroundings.

of choosing the species to be cut from an endless variety of entirely unknown trees and of inducing the natives to contract for the cutting of the same, that having been found the most satisfactory way of handling the labor question in the tropics. Gatun Lake, along the shores of which the logging was to be done, is approximately twenty-five miles long by twelve in its greatest breadth and is a lake of a thousand arms and islands. It is an artificial body of water held by Gatun Dam eighty-five feet above the salt water level. It is a reservoir for lockage water and for hydro-electric power and is one link of the canal proper, frequently giving the woodsman the rather unusual spectacle of one of the world's largest ships quietly slipping along through the tall uncut forest.



AN AVENUE OF WEST INDIAN ALMOND TREES

The standing forest in the lake bed was only cleared from a few areas such as the canal channel and the anchorage basins, and the rising water flooded the valley, hill, forest and farm to a depth of up to fifty feet, so that the lake is standing full of the skeletons of the former forest, or, what is worse to the logger, the snags of the trees that have rotted off at the water's edge and fallen, for these snags just below the water are as hard or a little harder than they were when green. The loggers' job was to cut these trees, often nearly as hard as iron and as heavy, roll them into the lake, float them through the snags and trees and load them on the cars at the railway. That we are getting the timber at all speaks well of the bush man, who is far from the indolent person he seems at first sight and is more the victim of conditions and lack of training, than a willing idler. He is doing the heaviest work regardless of the tropical discomforts of fever, insects, heat and rain. He has not the slightest knowledge of the American woodsman's tool, the machete, or brush knife, replacing with him all of the other implements of either husbandry or logging; and it is only

possible to induce him to give it up after a long season of education, but these men know the ways of the bush and will in time, learning the use of proper tools, become valuable workmen.

Many were to be the surprises and the mortifications of the cruiser who selected the timber to be cut. It was not enough that he must witness the weird freaks often indulged in by some innocent looking tree of apparently decent habits and good timber form, but the result of his judgment came in for most rigid inspection. Criticism seemed to be free to every one and he was generally held personally responsible for the behavior of his selections. A typical failure in choosing a species was that scored by the espavay, from which tree the natives have hued their canoes since time began. It grows to a large size, is common everywhere, floats and seemed likely to be just what was wanted for a rough building material. Indeed, it had been, so rumor said, successfully sawed in various faraway places. The first difficulty was encountered when the saw struck the log. One side cut all right, but the other was like rope, such a bunch of fuzz I never thought could come out of a tree. The sapwood on a large log would be a foot through, white or yellow, with a woven winding grain; the heart was red, gritty, hard and so



LIGNUM VITÆ, OR GUAYACUM, IN ITS NATIVE SURROUNDINGS

brittle that a six by six would break from a three-foot drop. The sapwood was stronger, but was attacked by millions of boring beetles that would destroy a timber in a single night. To stop these ravages the lumber was put into the kiln the moment it left the saw and by this means was rendered immune to further attack, but under this treatment it took to winding, twisting and splitting beyond expression.

Experiment finally showed that this species, treated to live steam and then dried under a shed with plenty of ventilation, while it showed a tendency to decay, could yet be used where strength was not required. The use of



NOTE THE GROTESQUE SHAPES INTO WHICH THESE ALMOND TREES (ALMENDRA) HAVE BEEN BENT BY THE TROPICAL WINDS

this species has been discontinued, the cost of saving it being disproportionate to the results obtained.

Other trees were tried, some of their lumber would split open in the sun and continue the process down to near the excelsior stage. Others that when fresh from the saw, seemed strong, serviceable lumber, yet dried up to be as soft as cork, or became as brittle as chalk. Some had poison sap, some decayed within a few weeks, and nearly all were attacked by borers and beetles.

Those first days were dark days indeed, but slowly one and another variety was found that stood all of the tests and proud indeed was the hour when lumber, actual lumber, fulfilling all requirements, began to pile up in the yard—lumber that one could trust alone over night without dire misgivings for the morrow.

Three soft wood species have proven their value, but these, while very beautiful and useful, are not in sufficient stand to be of commercial importance; indeed, it is difficult to secure all that we need for our own uses, but the hard wood is a very different story. We have large stands of this and they should be of the greatest importance to the trade.

Lignum Vita, generally well known, is plentiful and has been supplied to the various navy yards, where it has given entire satisfaction. It is a very large tree and is unbelievably strong and is heavy as well, about seven pounds to the board foot. The natives bring it in slung under a dugout canoe in logs up to forty inches in diameter and fifty feet long.

Nispero, or bullet wood, is the local rubber tree and is the wood eternal. Timbers in the old Spanish forts along the coast are still sound after a century or so of exposure to the weather. This wood is springy as well

as strong and splits well. What wonderful ties it would make, and this may be the eventual use of the timber, for the gum hunters in their rush for rubber have girdled every tree in the forest and all are dead or dying. These trees will, of course, stand for many years to come and may still be utilized.

Almendra is a larger tree even than the *Lignum Vita* and the most plentiful hardwood in the forest. It is unexcelled for fenders and heavy ship work requiring timber harder and stronger than oak. Some *Almendra* fenders were put on a heavy dredge between sections of white oak by way of a test, and within three months were reported as an absolute failure. This was a heavy blow to the somewhat friendless individual that stood sponsor for the species used and great indeed was his relief when examination proved that the *Almendra* stood without a mark while the white oak chafed to pieces. The crew, following the usual custom, jumped to the conclusion that the native species was no good. Indeed, I have found that the native substitute has to be far better than the timber it supplants in order to pass the willing and self-appointed critics. The climate is far from kind to any wood. Oak goes to pieces in about six months, sap pine in a few weeks, but the casual observer does not know this and judges native species with the behavior of lumber in the States. There are many other valuable woods of which we are learning slowly. Some day, perhaps, the sum of our knowledge will enable private capital to unlock some of the vast storehouses of the interior (Government operations will doubtless be confined to the Canal Zone). Heretofore the maze of worthless timber and lack of definite knowledge as to what really was merchantable has effectually barred the good timber from a long ready market.

FOR THEM A TREE STANDS THERE

GEORGES CUVIER was born in 1769—one hundred and fifty years ago. This pupil of Linnaeus is rated one of the greatest naturalists the world has ever seen. Perhaps only to the elect is the name Cuvier known, but people are noting the century and a half since he was born, so great has been the interest awakened in the planting of things. The planting of Memorial Trees easily takes the lead in this revival. In the planting of the living, growing tree the people of this country are erecting their own memorials not only to those who gave their lives to their country but to those who offered their lives. The planting takes many forms and is not confined to remembering war heroes. Just the other day the Whitman Park Improvement Association planted a tree in honor of Walt Whitman to mark the hundredth anniversary of the poet's birth. In many schools and colleges, graduating and incoming classes are planting Memorial Trees to come back to at future reunions. One of the most far-reaching forms of co-operation with the American Forestry Association is the call to the Christian Endeavor Societies of the World to plant Memorial Trees. This call has been sent out by the Rev. Francis E. Clark.

All Memorial Tree planting should be reported to the American Forestry Association at once, so it may keep its honor roll of such planting complete.


Following the suggestion made by the American Forestry Association that Memorial Trees be planted in honor of Jane A. Delano, of the Red Cross, the first tree reported placed in her memory was at Canton, Pennsylvania, her home, by the Village Improvement Association. Thirteen trees were planted on the playground maintained by that organization. One of these was planted in memory of Sidney R. Drew, the son of the actor, whose home was at Canton. Twelve trees were planted in a circle and the tree for Miss Delano was placed in the center. The exercises were opened with the singing of "America" and Mrs. Emmeline Leavitt, the oldest member of the Daughters of the American Revolution in the state of Pennsylvania, said the prayer. Mrs. Frederick W. Taylor, the president of the Association, gave the address. Mrs. L. M. Marble, of the Canton Red Cross, a neighbor of Miss Delano, told of the Red Cross worker's love of the hills about Canton and how she had expressed a hope to return to them as soon as the war work was ended. Mrs. Charles H. Derrah was in charge of the exercises. The Canton honor roll will appear in an early number of this magazine.

Another impressive ceremony was the dedication of the "Patriot's Grove," near Philadelphia, by the National Farm School. Here trees have been planted in honor of those who gave their lives to their country and in honor of those who offered their lives. A flag pole was dedicated to the memory of Henry F. Singer at the same time. In the list of speakers at this ceremony were Judge John M. Patterson, Edward Bok, John H. Mason, Joseph


Pennell, Harry W. Ettelson, Franklin Spencer Edmonds. Though not as large, of course, this grove is along the same idea as that one planted at the United States Army Balloon School at Ft. Omaha and Ft. Crook. At these places Col. Jacob W. S. Wuest has directed the planting of five thousand trees in memory of those who died and in memory of those who served from that camp of instruction. Two of these trees are for Red Cross workers who died at the camp. These trees are being marked by the next of kin with the bronze markers designed by the American Forestry Association. This list will appear on the honor roll in a forthcoming number of the American Forestry Magazine, as will that of the National Farm School. A "Hero Grove" has been dedicated in Golden Gate Park, in San Francisco. At this dedication one of the most remarkable demonstrations was seen. Daughters of the Golden West laid Wreaths of Remembrance on an obelisk in the park. These wreaths came from hundreds of towns and cities in California. The citizens joined in the biggest Community Sing the city had ever heard. A great community spirit is being born out of Memorial Tree planting. Coloradans in San Diego are making plans to plant a Memorial Grove at Camp Kearny. Miss Isabella Churchill, the secretary of the Quadrangle Committee, 2170 Fourth Street, San Diego, has sent out a call to all Colorado people to help in marking the spot where the camp is maintained, for it was through this camp many boys from that state passed.

Another example of community work is the building of a Memorial Park at Reading, Massachusetts, in one day. Everything was planned weeks in advance and everyone had a place in the all day work. A wilderness was turned into a beauty spot and the honor roll from Reading will appear in American Forestry shortly. At Lynchburg, Virginia, Honor Oaks have been planted at a ceremony attended by a tremendous crowd. E. F. Sheffey, president of the board of aldermen, presided. Rev. Joseph B. Dunn and Dr. James D. Paxton took part in the ceremony, which was conducted by J. T. Yates, J. C. Woodson, and G. H. Read, of the Park Department, and a committee from the Woman's Club, of which Mrs. James R. Kyle was chairman. In Cincinnati, pupils of the Avondale School planted Memorial Trees and at the ceremony Leona G. Van Ness, of the third grade, dedicated the trees. Miss Annie L. Kinsella informs the Association that the little girl based her talk upon suggestions she found in three copies of American Forestry. Another school to plant Memorial Trees is the Municipal University of Akron, Ohio. The planting of Memorial Trees by the graduating class of Georgetown University, when fifty-four trees were placed in honor of her sons who gave their lives in the war, is the most extensive planting by a college thus far reported to the Association. The trees, Lombardy poplars, typical of France, were planted in "The Walks," which is surrounded by a natural amphitheater of sloping, wooded hills. The trees


LIVING MEMORIALS FOR THOSE WHO DIED



On left—Planting of Victory Oaks at Lynchburg, Virginia.



On right—Leona G. Van Ness planting Victory Oak at Cincinnati.



Below — Dedication "Grove of Heroes" in Golden Gate Park, San Francisco.

are marked with the bronze marker designed by the Association. Dr. Ernest LaPlace, of Philadelphia, delivered the oration dedicating the trees.

Making our motor highways "Roads of Remembrance" is a suggestion of the American Forestry Association that has been taken up throughout the country. The suggestion was made coincident with the start of the Motor Transport Corps' transcontinental run from Washington to San Francisco. Newton D. Baker, the Secretary of War, dedicated the Zero Milestone from which the truck train started. The Association urges planting of Memorial Trees, Memorial Parks and Memorial Groves with the routes of the motor highways in mind. Indeed, the erection of any form of Memorial should keep the routes in mind, the final result being one vast chain of Memorial Drives that will make the country easy to see and at the same time the most famous touring country in the world. With France as an object lesson and the United States

facing a road building era involving the expenditure of half a billion dollars, there is a fine opportunity to do something big in an educational way for forestry by having the people, by county units, beautify these roadways. The beauties of French roads are widely known. A Roads of Remembrance campaign has been taken up in Great Britain. In France road building is going forward that will connect the cemeteries and the famous battlefields. We in this country do not have these battlefields and cemeteries to connect, but in connection with the erection of memorials of one kind and another, why cannot a definite plan be worked out whereby the memorial can be placed within easy access of the motor highways? Then, with the proper planting of Memorial Trees having been done in the meantime, we will have a countrywide memorial which will be worth while and a fitting tribute to the men who answered their country's call.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

WASHINGTON, D. C.—By Georgetown University: John B. Ahearn, James C. Amy, Melvin M. Augenstein, Joseph Baumer, David L. Bawlf, J. A. Beck, Charles T. Buckley, Douglas G. Cameron, M. J. Carroll, Thomas C. Carver, John Cissel, Edmund J. Crowe, Walter P. Desmond, Dennis R. Dowd, Jr., Ralph E. Donnelly, Julian N. Dowell, James P. Dunn, Alexander P. Finnegan, Arnulf Gloetzer, James L. Goggins, August DeY. Green, Robert M. Hanford, Harold Hall, Maurice L. Harding, Warren G. Harries, Albert Holl, Charles W. House, Grandville Jones, Louis J. Joyce, John J. Keady, Joseph T. Keleher, William L. Kelly, James L. King, John Lyon, Ernest P. Magruder, John Mahlum, John W. Marino, John A. Martin, Joseph G. McDonald, William F. McNierney, William F. Miltenberger, T. J. Moran, Leo Malcolm Murphy, Frank Murray, Joseph A. Parrott, Edward S. Pou, Gilbert Sanchez, William A. Sheehan, Francis M. Tracy, A. G. Vanderlip, Julian Robert Worthington.

CANTON, PA.—By Village Improvement Association: Jane A. Delano, director general, nursing department, Red Cross; Leroy G. Clark, William Mandeville, Gordon B. King, Corp. Sidney R. Drew, Mack M. Jenkins, Ernest Williams, Sgt. Ray Myron Crandle, Paul Turner, J. Howard Wilcox, Howard Soper, Leon C. Wilcox, Corp. J. Harry Mason.

CHAMBERSBURG, PA.—By Falling Spring Presbyterian Church: Lieut. James G. Nixon.

CORAOPOLIS, PA.—By Coraopolis High School: John Arthur Holmes, Vance Hays, John Wesoloski, David Pugh.

DEVON, PA.—By Mrs. Emory McMichael: Lieut. William Bateman.

EAST STROUDSBURG, PA.—By White Oak Run School: J. L. Strockbecker.

MIDDLEBURGH, PA.—By Shambach and Wagenseller: Charles F. Mitchell.

PHILADELPHIA, PA.—By National Farm School: Louis Berkowitz, Jacob Bledenthal, Morrie A. Deutsch, Jerome L. Goldman, Lieut. Jesse Warren Guise, Simon C. Hellman, Joyce Kilmer, Roy Stewart Marlow, Dr. G. M. Neuberger, Sgt. Harry Polinsky, William C. Rees, Byron H. Reis, Capt. Eugene Rice, George Burton Rosenthal, Alexander J. Roth, Lester B. Rothschild, Mortimer Strauss Rubel, Henry F. Singer, Solomon Spicker, Milton Stern, Bernard W. Traitel, Eli Wittstein, Lieut.

Ralph Anspack, Herman L. Artzt, Nelson H. Artzt, Justin S. Bamberger, Eli D. Bernheim, Harold B. Blumenthal, Albert Coons, Jerome Drucker, Isadore J. Faggen, Samuel Faggen, Leon Feigenbaum, Ensign Milton Stanley Getz, Herbert F. Goldstein, Jacob F. Goldstein, Ralph Gutlohn, Julian A. Hillman, Sgt. Isaac L. Hyman, Dr. Leopold Max Jacobs, Reuben Jacobs, Charles S. Kaufman, Corp. Walter Kaufman, Sgt. Manfred R. Krauskopf, August Manasses, Dr. Jacob L. Manasses, J. DeRoy Mark, Leonard George Needles, Isadore Oppenheimer, G. Sidney Reinheimer, Leon W. Reinheimer, Herbert D. Reis, Eli M. Rohrheimer, Sgt. Jerome H. Rose, Sgt. S. Ralph Schwarzschild, J. Leonard Sessler, Arthur Shoenberg, Arthur Silverberg, Edwin H. Silverman, Leonard Sostmann, Capt. Camille Stamm, Morris H. Starr, Arthur A. Strouse, Frank L. Teller, Ensign Jerome L. Teller, Philip H. Weinberg, Gustave L. Winelander, Stanley S. Wohl, Myron Albert Zacks.

VALLEY FORGE, PA.—By Daughters of the American Revolution: Lieut. Warren T. Kent.

HIGHTSTOWN, N. J.—By the High School: Harold Fones, Lewis Forman, Samuel Platt, Jr.

HOBOKEN, N. J.—By the High School: Frank LaPointe.

JERSEY CITY, N. J.—By Schools Nos. 1 and 16: Frank Braitsch, Louis Cohendet, Alexander Brady, Henry Johnson, George Devlin, Joseph Weinert; by School No. 4: Dr. Leonard M. Kalaher; School No. 5: Boys of Neighborhood; School No. 19: Michael Keaveny, Harry R. Holler, Louis Halperin, John J. Doris, Michael P. Smith, Thomas O. Dorward, Anthony Mafarra, James T. Barke, William H. Reuter; by School No. 21: Boys who had attended School No. 21; by School No. 30: Roy Losey; by School No. 32: Max Frank, Francis Dillon, Frank Sardoni, James Mason; by School No. 33: Roosevelt, Victory, Peace, Foch, Wilson, Pershing.

NEWARK, N. J.—By Memorial Tree Committee: Sgt. Irving C. Olstrum; by Boy Scouts of America: Theodore Roosevelt.

PARK RIDGE, N. J.—By Free Public Library: Edward B. Abrams, Charles F. Stalter, Fred H. Pysner, Martin F. Casteloni, Lester McGinnis.

PLAINFIELD, N. J.—By Watchung School: Holmes E. Marshall, Russell Hall, John H. Down, Benjamin H. Giles.

RAHWAY, N. J.—By Wilfred Smith: Lieut. Henry W. Cleary.

TREE PLANTING BRINGS OUT COMMUNITY SPIRIT



Upper—A community sing was one of the features of tree planting in San Francisco, and this picture shows what interest can be aroused when the "gods' first temples" are used.
Lower—Part of the throng at Lynchburg, Virginia, when memorial trees were planted.

RED BANK, N. J.—By the High School: Lieut. Herbert O. Tilton.

SOUTH ORANGE, N. J.—By St. Andrew's Church: John W. Weir.

TRENTON, N. J.—By Mrs. Elizabeth O. Hunter: Lieut. E. Oliphant.

WEST ORANGE, N. J.—By West Orange High School: James Sayers, Miles Suarez.

ASHVILLE, N. Y.—By members of Ashville Grange 694: H. Vincent Moore.

COLLINS CENTER, N. Y.—By the High School: Dr. Herbert W. Mackmer.

DOLGEBVILLE, N. Y.—By Boy Scouts of America: Theodore Roosevelt.

MOUNT VERNON, N. Y.—By Westchester Woman's Club: William Wiley Hayward.

NEW YORK CITY.—By Mrs. Regina Rubel: Lieut. Solomon Rubel.

OGDENSBURG, N. Y.—By St. John's Episcopal Church: Frank M. Hanbidge, George Ashwood, Frank S. Harper, Clarence Merris, Charles Holbrook, Clarence W. Streeter.

SYRACUSE, N. Y.—By St. Patrick's Church: Sgt. John J. Hogan, Raymond Koagel.

VALATIE, N. Y.—By Chatham Union School: Miss Catherine Smith, Soldiers and Sailors.

COLUMBIA, TENN.—By Business Women's Association: Lieut. Clarence H. Fry, Lieut. J. C. Wooton, Sgt. Joe B. Warren, Walter D. Goodwin, Clifford Earl Hutchinson, C. W. Hamilton, Jr., Corp. James W. Wilson, Horace Hickman, Melvin White, Eli Richard Haywood, William Rufus Crumley, Corp. Eugene W. Huckaby, Walker Fitzgerald, Tom Workman, Corp. Herbert L. Griffin, Lieut. Robert B. Glibreath, John Thomas Richardson, Corp. Basil O. Blocker, Wilson D. Holman, Robert A. Hays, Capt. Meade Frierson, Jr., John Will Thompson, Rex Bernard Vestal, Osey Jones.

KNOXVILLE, TENN.—By Park City Presbyterian Church: Lieut. William Hugh Eckel, Dick Dickson.

NASHVILLE, TENN.—By Fall School: Guy R. Only, Raymond F. Houston, John W. Weber; by Tarbox School: Capt. Charles Duncan, Harold Goodwin, Marshall Goll, Emme Manier, Carter Milan, Ed J. Walsh, Dan Wasserman, Walter S. Yarbrough.

GREEN BAY, WIS.—By Mrs. C. Richard Murphy: C. Richard Murphy; by Miss Jessie DeBoth: Lieut. E. R. DeBoth; by W. D. Fisk: Hiram Fisk, Arthur C. Neville, Sgt. William H. Livie; by P. H. Martin: Lieut. John Martin, Lieut. Jerome Martin, Joseph Martin; by Mrs. Margaret Parmentier: Capt. Jules M. Parmentier, Capt. Douglas Parmentier; by Mrs. Arthur McCarey: Major Arthur McCarey; by Mrs. M. E. McMillan: Myron McMillan; by Mrs. Frank H. Hoberg: Lieut. Leroy Hoberg; by Mrs. J. P. Lenfesty: James Nuss; by Mrs. Herbert MacPherson: Capt. Leland Joannes, Kenneth Hoefel; by Mr. J. R. North: Reynolds North, Ludlow North; by Mrs. Mitchell Joannes: Lieut. Frederick Kendall; by Mrs. W. E. Collette: William Harold Collette; by Mrs. R. C. Buchanan: Frederick C. Parish, Edward Tyrakoski; by Mrs. Fred L. G. Straubel: Major Clarence Welse Straubel; by Kellogg Public Library: Patrons of the library; by Mrs. S. D. Hastings: Women's Committee of Brown County Council of Defense; by Mrs. A. C. Neville: the nurses of Brown County; by the Country Club: Lieut. Harry Howland Fisk, Lieut. Robert S. Cowles, John Parrish, George Van Laanan, John Vance Laanan, Capt. V. I. Minahan; by Junior High School: Lieut. Reginald Calkins.

AKRON, OHIO.—By Students of the Municipal University: Thomas B. Welker, Thomas J. Quayle, John Laube, Lee W. Pitzer, Bernard Adler, Ray A. Bohl; by The Boy Scouts of the Goodrich Rubber Company: 250 trees for Theodore Roosevelt.

CINCINNATI, OHIO.—By West Fork School: Roman J. Heis, Henry W. Deucher; by Pleasant Ridge School: Lloyd McArthur, Earl L. Parrott; by Westwood School: John Henry Koenig, Dr. Clement Laws, Anthony Schwab, Jens Paterson, Edwin Harder; by Oakley School: Norman Le Roy; by Bond

Hill School: Hanley Masters, Walter Volkert; by Carson School: John Rowan, Walter Sang; by Whittier School: Lovett Channel, Clifford Paddock, Wesley McKinney, Harold Van Matre; by Eighth Grade Civic Club: The Heroes, William Heiert, Our Fallen Heroes; by Seventh Grade Civic Club: Frank Wagner, Ralph Wagner.

ELMWOOD PLACE, OHIO.—By Elmwood Place High School: Homer L. Gilbert, William H. Peters, Ralph D. Breckel.

TWINSBURG, OHIO.—By Boy Scout Troop No. 1: Orland Bishop.

BAXTER SPRINGS, KAN.—By Baxter Springs Women's Club: Nathaniel Burns, Harry E. Davis, Albert McCoy, Frank Morford, Frederick Young, Leonard Armstrong, Clarence McCullough, Albert Schroeder, Grover C. Taylor, Francis Roland Romack, Clinton West, Harry G. Smith.

LAWRENCE, KAN.—By Lawrence Public Schools: Mark Beach, Albert Ellis Birch, Max Brown, John Wilfred Charlton, Charles Luther Cone, Everett Demeritt, Eli Ferri Dorsey, Ralph Ellis, Herbert Jones, Thomas Kennedy, Harry Ziesenis, Artemus McClure, Clark William McCulloch, Glen Otis, Ross Rummell, Oliver Cromwell Tucker, John Tupper, Theodore Rocklund.

DETROIT, MICH.—By Juvenile Detention Home: Lieut. Clifford B. Ballard.

TIPTON, MICH.—By the Red Cross: E. Leroy German.

FORT OMAHA, NEB.—By United States Army Balloon School: John Nagel, George Joseph Pahl, Maude Mae Butler, Walter P. Peterson, George H. Williams, Zell S. Killingsworth, Vernon G. Heverly, Dan A. Jacobs, Albert A. Bachand, John J. Nimmo, Albert L. Mower, Oscar K. Westberg, Hugh Scanlan.

NORFOLK, NEB.—By the High School: Charles Hyde, Harry Koenigstein, Roy McCaslin.

SUTTON, NEB.—By Mrs. A. W. Clark: Lou's Case, Daniel Zimmerman, John P. Pauley.

AURORA, IND.—By Aurora Women's Research Club: Dewey H. Hauck, Henry Scharf, Russell Winkley, Bernard Burke, Frederick S. Steele, William Keith Ross, Charles B. Idner, John Bildner.

EVANSVILLE, IND.—By Mrs. William Igleheart: Lieut. Douglas Vele.

GOSHEN, IND.—By Chamberlain School: Mayor Daniel J. Troyer.

CAIRO, ILL.—By Cairo Women's Club: Claude C. Robinson, Corp. Leonard A. Clifford, Paul Cochran, Lieut. Paul Clendenen, Hans Miller, Joseph Glynn, James Herring, Corp. George Mills, Arthur Lieberman, Morrin Langon, Cecil M. Reynolds, Dan Crowley, Jesse Lewis, Eddie Street, Edward Mart'n, David Brice, James Johnson, Charles F. Stokes, Willis Holland, Hunter Barksdale, James Bowden, Thomas Scarber, Lieut. Albert Stout, Sgt. Frank Gibson, Felix Eakins, George Coleman, Will Smith, Robert S. Courtney.

BELLELEVILLE, ILL.—By School No. 2: William T. Smith; by School No. 4: Carmine Caruccio; by School No. 3: George A. Younginger, Charles E. Morgan and George J. Kalvio.

CARBONDALE, ILL.—By Capt. John Brown: Donald Forsythe, Curtis Allison, William Watson, Lieut. Arthur R. Carter.

WHITE HALL, ILL.—By White Hall Round Table: Charles Martin; by White Hall Domestic Science Association: John Fisher; by White Hall Art League: Amos Walker.

ELGIN, ILL.—By Mrs. Edgar Post: Helen Penrose.

STAFFORD SPRINGS, CONN.—By Anna Handel: Madison Willis.

NORFOLK, VA.—First Christian Church: Shirley Owens.

DIXIE, WASH.—By Dixie School: James Lauritsen, Oliver Hastings.

TACOMA, WASH.—By Stadium High School: William Campbell, Malcolm Johnstone, Herman Uddenburg, Charles Huckaba, Elmer Anderson, Wilbur Cook, Arthur Wales, Clyde Moore, Duane Shields, Asa Purkey, George Muir.

MT. VERNON, WASH.—By Washington School: William Hilliker.

MYSTERIES AND REVELATIONS OF THE PLANT WORLD

BY D. LANGE

(WITH PHOTOGRAPHS BY THE AUTHOR)

THE GREAT Swedish naturalist Linnaeus, the father of modern scientific nomenclature, described about 10,000 different plants. Since his time scientific explorers have gone out to all parts of the earth to continue the census of the plant world, but to this day the census is still so far from complete that every year a hundred or more field men can each bring large collections of new species to the great herbariums of Europe and America. So vast has grown the number of plants discovered and described that if Linnaeus could come back to his beloved Upsala, he would be lost in his own realm, for his modest census of 10,000 plants has grown to the bewildering total of 250,000 and will very likely pass 300,000 before the last returns are in, if in fact, there will ever be any last returns.

Of this vast number of plants probably about 10,000 are trees ranging in size from the dwarfs, four feet high to the giants that reach nearly four hundred feet toward the clouds. About 150,000 species would be classed as flowering plants, including grasses, herbs, trees, vines and small woody plants of all kinds.

The delicate fronded ferns

and their allies, the highest of the flowerless plants, would be represented by about 3,000 species mostly from tropical regions; and the tiny mosses, the humble pigmies among leaf-bearing plants, would add 16,000 species to the list.

The remarkable plants known as algae, which float as threads of green scum, or live as little green balls in water or moist places, or grow in the sea like the giant kelp, swell the census by at least 15,000.

The list would close with about 65,000 of that wonder-

fully diverse class of vegetables forms known as fungi. This class includes the small one-celled yeast plants, the parasitic blights, rusts and smuts, the various umbrella-shaped fungi popularly known as mushrooms and toadstools, the puffballs and many others. Each one of the 300,000 species lives and grows in its own peculiar way, but of very few do we know anything that approaches a complete life history.

Among this countless host of plants some species like certain orchids are so rare that several thousand dollars have been paid for one plant, while others flourish in associations so



THE BIRTHPLACE OF THE "FATHER OF WATERS"

The great Mississippi River starts as a small beaver stream under the roots of a fallen tamarack in Itasca Forest, Minnesota.

great that they cover large sections of whole continents. The best known but not the only examples of the latter are the grasses of the North American prairies, the conifers of our evergreen forests, and the broad-leaved trees of our great deciduous forest.

The heart of the great deciduous forest was the Ohio Valley. This forest consisted of an association of many



THE SHOWY ORCHID

One of the most beautiful flowers and readily identified as an orchid by its characteristic odor and taste, differentiating this class from all other plants.

species, and a century ago, it stretched almost without a break from the Atlantic Coast to Western Minnesota.

North of this broad-leaved forest extended a belt of evergreens to the limit of trees into sub-arctic regions and westward to the treeless plains. This vast forest consisted however of comparatively few species. In its southern region the white and Norway pines were the dominant trees. They grew taller and lived longer than any other species, and where fires or storms had not interfered for a century or two they had crowded out, or at least suppressed every other kind.

Farther north, especially on poorly drained lands, the black spruce becomes dominant, while vast swamps, too wet for the spruce, are covered with tamarack, which on better and higher land was crowded out by pines, spruces and other species.

From Illinois to the foothills of the Rocky Mountains stretched the largest grassy meadows of the world, known as the prairies.

The question why these great fertile regions remained treeless is not easily answered. Over a part of the prairies the rainfall is insufficient to meet the great demands of trees for water. For contrary to the popular idea, forests do not cause rain-

fall, but an abundant rainfall makes forests possible.

However, over a large part of the prairies other factors have operated against the spread of trees. The grasses developed early in the geological history of North America, and when the plains first emerged from the sea, the grasses were able to cover the soil before the trees could reach the new land. The compact unbroken sod formed by their roots made it difficult for trees to secure a footing, but wherever the soil was broken by streams and the waves and ice of lakes, trees and shrubs have successfully invaded the great plains and now fringe every lake and river.

Nearly all the prairie grasses and flowers are perennials well fitted to resist annual or occasional severe droughts. Nor could millions of grazing buffaloes and the fires started by lightning or by primitive man harm the underground rootstock of these plants. To seedling trees, however, a fire means almost certain destruction.

On the western plains in the Bad Lands region and in



SKUNK CABBAGE—FIRST FLOWER OF THE NORTHERN STATES AND CANADA

The large seeds have most likely been scattered by bears.

the foothill country the short grasses are rendered still more drought-resistant by having their roots protected by hard impervious sheaths. These grasses produce the black-root sod, which western ranchers and pioneers employ as building material, and the walls constructed of black-root sod are almost as durable as those built of brick.

Leaving out of consideration here the rather complex problem of plant distribution over the Black Hills, the Rocky Mountains and the Great Basin we reach on the

Sierra, the Olympic and the Cascade Mountains the grandest and most remarkable forest of the world, which stretches from California northward to the limit of trees in Alaska, through more than two thousand miles of latitude.

From California to Puget Sound is a forest of enormous redwoods, yellow pines, Douglas firs, western hemlock and other evergreens, including the remarkable isolated groves of giant sequoias containing trees of almost incredible size and age. But not only the great sequoias but also the redwoods and firs are giants, often reaching a height of two hundred to three hundred feet. In these forests the little Douglas squirrel and a number of small birds live permanently in the tree tops and, as one boy expressed it to me, can only be studied through a telescope.

In extent, in density, in the kinds and size of their trees, these forests have no rival on our planet.

Besides the fascinating questions regarding the size, the distributions and survival of their component species they present another perplexing problem: They are the most exclusively coniferous forests in the world. Broad-leaved trees here and there make up six per cent of the whole, but in many regions they form only a small fraction of one per cent.

Very few representatives of our eastern forest regions can be found here. There are no elms, no hickories, no chestnuts, no catalpas, persimmons, sassafras, magnolias; no lindens, no tulip trees, no locusts; and many other whole genera found from the Atlantic coast to the plains are entirely absent.

Several oaks, a few maples, one birch, one ash and an alder are among the scant representatives of broad-leaved trees, but they seem to live only by sufferance in a forest which everywhere presents an unbroken array of the somber spires of the conifers.

In preglacial times the coast region did possess elms and beeches as well as gum trees, magnolias and chestnuts. Why these and others have disappeared never to return is one of the great riddles of the plant world.

In some regions of the earth, a rankly growing vegetation has almost suppressed human and animal life. This is true of the great rain-soaked beech forests of temperate South America, which Darwin describes so

well in his journey on the *Beagle*, and of the tropical forests of Africa. Another illustration of this dominance of plant life is furnished by the great tropical forests of the Amazon Valley of which the English naturalist and collector, Bates, has furnished us a classic account in "The Naturalist on the River Amazon." In tropical Africa human dwarfs have found a refuge in the impenetrable forest, and the monkeys of the Amazon Valley are compelled to live in the tree tops.

The greatest development of higher animal life has taken place in open and comparatively dry regions. Semi-arid South Africa is the home of the greatest number of species of big game, while the buffalo herds of the North American prairies and the caribou herds of the Arctic

tundras, are equalled nowhere else on earth.

The length of life among plants varies even more than among animals.

The edible ink mushroom produces its umbrella-shaped column over night. A few days later the whole plant has deliquesced into a patch of black ink, and within a week not a trace is left of its existence.

The giant sequoia, on the other hand, has outlived the great empires of human history, enjoying a vigorous growth for three or even four thousand years. No fungus or insect pest is able to harm it. Its top reaches three hundred and fifty feet toward the sky and if storms, lightning and resulting fires did not at last bring it down, it seems that it might live and grow forever. And when, in the end, the giant trunk has

crashed to earth amongst the smaller trees surrounding it, a long depression in the soil tells of the big tree even centuries after forest fires have consumed the enormous mass of sound wood, to which fungus, insects and the tooth of time could do no harm. Some of the giants still growing in Mariposa Park were already big trees, as New England and Minnesota measure trees, when Abraham pastured his flocks in Palestine.

Curious and innumerable are the methods of traveling adopted by plants. Most plants can, of course, travel only as seeds, although there are not a few exceptions to this rule.

The advantage of the first comer, the squatter, one might say, plays an important part in the world of plant



A RIVER BOTTOM FOREST OF YOUNG ELMS

The seeds of the elm, birch, maple and ash are carried by both wind and water.

life. The cotton tufted seeds of willows and poplars, and the little winged seeds of the white birch are carried by the wind in every direction, and they are produced in such abundance, that every nook and patch of bare soil receives its supply. The result is that these trees generally reach vacant land sooner than any of their competitors. The bare mud-flat left by a flood, the railroad gravel pit, the burnt-over and cut-over pinery are nearly always pre-empted by willows, poplars, or birches because their seeds are much more widely disseminated than the seeds of any other northern trees. Poplars and birches, however, are short-lived trees, and within a century the dominant pines will supplant them.

Shrubs and trees, as well as vines and herbs, that depend on birds for the dissemination of their seeds run the wind-planted species a close race. Woodbine and wild grapes, elder, dogwood and hackberry, wild cherries and plums, strawberries and raspberries spring up as if by magic as soon as the lumberman, fire or storm have cleared the ground for them.

Of many plants it is not very difficult to discover their methods of traveling.

The seed of maple, pine and dandelion sail like parachutes away from the parent plant. The gold-dotted hedges of jewel weed, or touch-me-not, which mirror their delicate flowers and foliage in the dark, silent water of northern beaver ponds are planted by the beavers themselves as they travel and work on their dams; while birds in their daily and seasonal flights, plant those remarkable gardens of many kinds of wild fruit, whose presence on widely separated islands and mountains and in the depth of isolated canyons delights both the eye and the palate of the explorer.

There are, however, numerous instances of plant distribution which present most interesting puzzles to naturalists and foresters.

The limber pine is a fairly common tree at an altitude of six thousand feet in the Rocky Mountains. It is not found on the stretch of two hundred miles lying between the Rocky Mountains and the Black Hills, but on the trail to Harney Peak, in the heart of the Black Hills, at an altitude of about six thousand feet, stands a grove of about twenty-five limber pines, the only trees of that kind thus far discovered in the Black Hills. How they traveled over the intervening two hundred miles is a

mystery. One of the most puzzling cases of plant migration or distribution is that of the devil's club. This plant is a common shrub in the moist forests of the Pacific coast and in certain localities in the Rocky Mountains, where, on account of its countless sharp spines it is the terror of woodsmen and timber cruisers. It is not found in the forests touching the Great Lakes, except in several spots on Isle Royale in Lake Superior. By what means it traversed the intervening thousand miles of plain and forest and established itself on an island in Lake Superior seems an insolvable riddle.

One possible solution must not be overlooked in such cases as that of the devil's club and the limber pine. They may be cases of a remnant vegetation, just as scattered groves of giant sequoias are undoubtedly only

the remnants of former large sequoia forests.

Such remnants are not rare. On Sheep Mountain, in the Bad Lands of South Dakota, I found isolated groves of yellow pine separated by a distance of fifty miles from the yellow pine forests of the Black Hills. I was much surprised to find that porcupines had killed a large number of these trees that were trying to maintain their hold on life under severe conditions of climate and soil, for one naturally thinks of porcupines as inhabitants of moist northern forests.

There has just lately been discovered a natural grove of jackpine in the driftless area of Minnesota, in Houston county, the most southeasterly county of the state. These trees are outposts of a former period and were left far behind, as the belt of evergreens



GIANT COTTONWOOD GROWING CLOSE TO THE RIVER

A cottonwood will grow eighteen feet high from a seed in three seasons. Within sixty years it is a giant.

retreated northward with the vanishing continental glacier. On their shaded sandy hillside these northern trees may keep a foothold for centuries to come, although the jackpine forest has moved fully a hundred miles north.

The case of the Kentucky coffee tree has been a mystery to me ever since I first saw its odd, bluntly ending branches on a winter ramble in a Minnesota woods. The tree bears large bean-like pods containing big hard-shelled seeds resembling somewhat in appearance roasted coffee beans. The great pods remain on the trees through the winter. Neither the pods nor the beans float in water and are, of course much too heavy to be carried by the wind. The seeds are as hard as pebbles, and, as far as I have been able to discover, no birds or animals eat

them. I kept a dozen of them in water for a year and found by frequent weighing that they did not absorb even a grain of water; but I also found that if they are planted in fall they will sprout in the first or second spring following. One seed I gave to a tame gray squirrel. He drilled a small hole through the shell, but dropped the seed as soon as he had reached the meat.

The tree, although one of our rarer forest trees, is fairly well distributed from Tennessee to Ontario and from Pennsylvania to the Indian Territory, but it grows in small colonies, often miles apart. It is found on rich bottom lands and on islands in large lakes. It may be that grouse occasionally swallow the seeds as they swallow pebbles, for it seems impossible that the seeds could reach islands without the aid of some bird. It is likely that the passenger pigeons in days gone by distributed the seeds of the coffee tree.

A small cactus, the jointed opuntia, is widely distributed in arid regions from New Mexico northward. In some mysterious way it has reached many dry rocky ledges in humid Minnesota and Wisconsin. A few years ago on a canoe trip on Lake of the Woods I found a fresh joint of this cactus among the boulders of the Ontario shore in a densely wooded region. How the plant reached this spot has remained a secret to me.

A whole book of miracles might be written on the mutual adaptations between flowers and insects. That many flowers are adapted to cross-pollination by insects is a fact of common knowledge, but that some of these adaptations have been perfected, one might say, beyond perfection, is not so generally known.

All our species of milkweeds, for instance, depend for pollination absolutely on insects. The peculiar structure of the flowers makes any other method impossible. Moreover the work is restricted to wasps and to large butterflies and moths. Small insects, even those as large as houseflies and honeybees are not strong enough to pull the anthers, shaped like tiny saddle-bags, out of their sheaths. To those insects the honey-filled and sometimes actually honey-dripping milkweed flowers are like so many baited traps, as deadly and remorseless to the hungry insects as the steel traps of the fur hunter are to

bears and beavers. Their feet are caught on the specks of sticky gum, which mark the joint of the two halves of the saddle-bag anthers. Trapped in this manner they are held prisoners until they die, and their shrivelled bodies may be found on almost every patch of milkweeds.

One might think that the powerful bumblebee and the milkweed would make ideal partners, but such is not the case. These remarkable plants, which not only flow with honey, but also invite their insect guests by a strong honey scent, are utterly ignored by the big hungry bumblebee, who have, for some unknown reason, acquired a passion for the purple of the clover and the blue of lobelias and gentians; although to the human observer, getting honey out of these flowers seems a truly laborious task.

The closed gentian, found in bloom in this latitude from the latter part of August to the middle of October, furnishes one of the most remarkable cases of adaptation of a flower to bumblebees. The striking whirls of beautiful sky-blue flowers are evidently a kind of bill-board advertisement to bumblebees. But these magnificent blue flowers, often made still more conspicuous by being delicately tipped with white seldom open. Day and night, in sunshine as well as in rain and fog, they remain tightly closed. Many observers have been led to conclude that this fine autumn flower had abandoned cross-pollination and resorted to self-pollination; however, careful observation has convinced me that such is not the case. The bumblebees do get into these closed gentians. In fact, I do not think they miss a flower on those



A WONDERFULLY BEAUTIFUL SPECIMEN

This stately white pine was planted for shade and ornament near a city home.

plants that grow in the open, where the gentians are not hidden by tall grasses.

With great care the hard working bumblebee selects a flower that has not been pumped dry by a buzzing competitor. Then, with his strong and long proboscis he finds the opening in the closely folded floral segments. With his head he pries the five segments apart and now, literally standing on his head he kicks and pulls himself with great effort into the blue honey well, until only his defensive posterior and a pair of legs remain partly visible, and if he is not a good sized bumblebee he disappears altogether. I watched one on a sunny September day, and I thought he worked harder than any other

bee I had ever observed. He examined flower after flower, many he rejected without opening them, in some he remained only an instant, but in one he stood on his head for fifteen seconds. Why does his tribe ignore the inviting flowing wells of the milkweeds and work labor-

ly produced for protection against specific dangers.

Cattle will not allow young hazel, oak and most other trees and shrubs to survive in a pasture, but the thorn-apple bushes will flourish because their sharp thorns keep away the browsing cattle.

There is a certain tree, the honey locust, which I venture to say no boy has ever climbed, although the tree is common and well known from New York to Illinois and from Texas to Ontario. Around the trunk most formidable, branched thorns stand out, some reaching almost two feet in length with the thickness of a man's finger. The locust trees and their relatives have a tendency to run to thorns. Do the murderous looking thorns, set like bristling bayonettes around the trunk, perform a useful function, or are they merely a case of a family trait run riot? Perhaps they keep opossums, raccoons and bears from climbing the trees and de-

vouring the sweet seed-pods, but I have had no opportunity to prove this surmise.

Each plant or family of plants produces certain substances which possess a characteristic taste and odor and other generic qualities.

Practically all the orchids of the world contain a sap of an odor and taste so characteristic that a blind person, with his hands tied, might distinguish orchids from other plants by using only his sense of smell and taste; but



OPEN GROVE OF BUSHY RED CEDAR ON SHEEP MOUNTAIN IN THE BAD LANDS

The seeds of the red cedar are planted by the birds.

iously on such difficult flowers as clovers and lobelias and the refractory closed gentians? And why does not this flower open like other gentians? Are the permanently closed flowers only a device to keep out feeble unbidden guests, or do they also serve to exclude dew, rain and frost, which might injure the delicate floral organs inside?

We all know trees and other plants by their leaves, which in shape, size and position display endless variety. Is there a meaning to all the different shapes and positions, or are some of them just accidents that have no meaning?

In general it may be said that each plant has evolved or is trying to evolve that shape, size or position of foliage, which serves best under its special environment to intercept the most favorable amount of sunlight and to regulate best the absorption of carbon dioxide from the air and the evaporation of water into the air. But why have nearly all the oaks adopted the lobed pattern of foliage as their own, while the large pea and bean family almost unanimously favor the pinnate or divided form? The maples all adhere to their well-known family pattern, and no conifer departs from the needle-shaped foliage of pines and spruces.

Certain plant structures and substances are evident-



SCRUBBY WHITE PINE ON ROCKY ISLAND OF LAKE OF THE WOODS

A most attractive spot, and well patronized by vacationists.

thus far no botanist has discovered the meaning of the peculiar fluid of the orchid family.

All the conifers of the world produce rosin or pitch. A

very large number of composites, the typical prairie flowers, also produce small amounts of rosin, and the foliage of nearly all of them emits the pungent odor of rosin.

Trees are always exposed to attacks from two hosts of enemies, fungi and insects. A wound in a conifer immediately causes a flow of rosin. The rosin embalms, so to speak, any fungus spores or insects that might find their way into the wound. The liquid rosin soon hardens and seals up the wound and, in the course of years, new wood grows over the antiseptic covering. The function of rosin in defending trees against insects was well shown in recent years after the great devastation caused in the yellow pine forests of the Black Hills by several species of bark-boring beetles. Fires and drought had weakened the trees and gave the beetles a great advantage for several years, so that they destroyed thousands of acres of fine forest. Then the government organized its forest service and prevented fires. Rainy seasons also returned, and the beetles began to be found dead in their tunnels under the bark drowned in the flow of rosin of the healthy and vigorous trees.

The meaning of the poison in the loco-weed of the western plains seems fairly clear. It protected the plants from extermination by the herds of wild buffalo, who evidently had learned to avoid it, for none of the early observers speak of finding "locoed" buffaloes. Domestic cattle, on the other hand have not yet learned to avoid it and are often killed by it, especially in seasons of poor pasture.

But what is the meaning of the alkaline poison in the poison ivy and poi-



WHITE HEARTS, OR "DUTCHMAN'S BREECHES"

How they travel from woodland to woodland is still a mystery.

son sumach? Would it have the same effect on browsing animals that it has on the skin of many humans? The poison evidently has no injurious effect on birds, because they eat freely of the white berries and scatter the seeds far and wide.

Certain plant forms, although they must be fairly common in nature, are nevertheless rarely found by naturalists and botanists.

The little green floating duckweeds, abundant on every pond in late summer, seldom produce their simple flowers and although I have been familiar



BLUE ANISE FLOWER OR GIANT HYSSOP

The method of dissemination of this lovely flower is also unknown.

with the plants since boyhood schooldays, I have never found the flowers.

The jointed scouring rushes, also known as horsetails or equisetæ, grow from small dust-like spores. They are

common plants, but it is almost impossible to find them in their first, or prothallium stage. Only once, in the month of July, did I find them as little green lumps on moist earth which had been pushed up from a lake bottom by a railroad fill. Many ferns are very common, but very few botanists and lovers of flowers have ever found the small heart-shaped fern babies except in greenhouses.

The beautiful pink-and-white moccasin flowers are fairly common in their favorite localities, moist meadows and spruce and tamarack swamps. But something seems to be mysteriously wrong with their methods of pollination and seeding. Many of the flowers remain unpollinated, and, of the millions of minute seeds produced, very few ever start a new plant. One could not find



BLUEBELLS OF SCOTLAND

The method of dissemination of this delicate flower is unknown.



ROSIN WEED

It grows twelve feet high and is the giant among prairie flowers.



CLOSED GENTIANS

Flaunting beautiful sky-blue flowers to tempt the bumble-bee.



BLUE LOBELIAS

The seeds of this dainty flower are probably scattered by the wind.

a seedling to a thousand adult plants. By the most careful search I have not found more than a dozen all told, and when a seed does start, it produces a most frail plantlet. Its stem, during the first season grows scarcely an inch high, the leaves are mere specks, and its tiny rootlets do not reach the soil through the thick cushion of moss on which the seedling nearly always starts.

Every year, however, the root approaches by a kind of hook-shaped growth a little nearer to the soil below, but I estimate that it must take a seedling from five to six years to establish itself as a vigorous plant whose future is assured. If nature had evolved a really successful plan of pollination and seeding in the mosses family those beautiful plants should be a hundred times as numerous, for the mature plants are vigorous and hardy perennials.

One of the most widely distributed plants over the whole northern hemisphere is the pale-green peat moss, sphagnum. It covers thousands of square miles in Europe, North America and Asia; but it has almost aban-

doned the sexual method of reproduction, and the little spore capsules characteristic of all mosses are rarely found. I have traveled over and camped near peat bogs and marshes ever since my early boyhood, but only once have I found the brown spore capsules, and that was in a small rocky basin on an island in Lake Superior at the entrance to the harbor of Grand Marais. I took the plants home to my room in the hotel, and in the evening as I was reading by lamplight, my attention was attracted by several explosions, just barely audible. I began to watch my moss plants. The warmth of the room had dried the capsules to the explosive stage and every time one of the little shells burst, a tiny brown cloud of spores was thrown into the air. It was the most intimate performance in the great drama of the plant world which it has ever been my good fortune to witness. The scene was enacted on an August evening more than ten years ago, and every summer since then, I have looked for the little brown shrapnels of sphagnum but I have never found them again.



A NATIONAL FOREST POLICY

THE PROPOSED LEGISLATION

BY HENRY S. GRAVES

FORESTER, U. S. FOREST SERVICE

THE NEED OF A NATIONAL FOREST POLICY TO PROVIDE FOR THE PERPETUATION OF OUR TIMBER SUPPLY IS APPARENT TO FORESTERS, LUMBERMEN, TIMBERLAND OWNERS AND EVERYONE. WHAT THIS POLICY SHALL BE, HOW IT SHALL AFFECT PRIVATELY OWNED TIMBER LANDS, NATIONAL, STATE OR MUNICIPAL HOLDINGS, AND HOW A POLICY MAY BE ADOPTED AND ENFORCED, IS NOW THE SUBJECT FOR DISCUSSION. AMERICAN FORESTRY MAGAZINE OPENS ITS COLUMNS TO ARTICLES ON ANY AND ALL PHASES OF THIS IMPORTANT TOPIC, AND OPINIONS ON THE SUBJECT WILL BE WELCOMED.—EDITOR.

ANY program of forestry which is comprehensive enough to anything like meet the needs of the country must involve the practice of forestry on privately owned timberlands. In my judgment this will not be brought about merely by educational methods. These have been tried for twenty years practically without result. There must be some requirement on the part of the public as to forest protection and as to forest renewal. The requirement must be nearly as possible equalized in all sections of the country and in all States so that no section or State will be placed at disadvantage.

The Forest Service has given considerable thought recently to the principles which must underlie any efforts toward the attainment of this desirable end. We have reached the conclusion that a satisfactory measure of success can be attained only through some plan of co-operation between the States and the Federal Government, with the States the active agents for carrying the plan into effect and with the Federal Government stimulating action and aiding the States.

We have worked out some of the principles which it seems to me should form the foundation of the system to be built up through the necessary legislation by the Federal and State Governments.

The principles of legislation requiring the practice of forestry on private lands are briefly as follows:

1. The first step should be a Federal act authorizing the Secretary of Agriculture, in co-operation with any State, to formulate plans for forest protection and for the control of timber cutting within that State. Such plans should become effective only after the State legislature had passed appropriate legislation, including adequate appropriation to co-operate with the Federal Government in putting them into effect. The Secretary of Agriculture should also be authorized to accept plans for protection or cutting which have been adopted by any State. Section 2 of the Weeks Law dealing with co-operative fire protection would therefore be superseded. The act should carry an appropriation.

2. Farm woodlands should be specifically exempted from the provisions of the act, for the reason that protection and conservative cutting for this class of forest can best be brought about through the education and demonstration work authorized by the Smith-Lever Act. The Secretary of Agriculture should be authorized, in

co-operation with the State, to define farm woodlands and distinguish between them and commercial timberlands.

3. All commercial timberlands and all cut-over lands on which a commercial forest (as distinguished from a farm forest) could be grown should be subject to the provisions of the act. But the Secretary of Agriculture, with the approval of the State, should be authorized to exempt any of such lands where it is demonstrated that the surface of such lands is more valuable for other purposes than for the production of timber and where such lands are immediately to be used for the more valuable purpose.

4. Owners of timber should not be compensated either by the State or by the United States for expenses incurred in carrying out the provisions of the act where only the renewal of the forest is concerned. But such owners should be compensated either by the State or by the United States (if by the latter, in the discretion of the Secretary of Agriculture) in the following instances:

- (a) Where for protection of the watersheds or for other protective purposes it is necessary that the timber should remain standing.

- (b) Where as a reserve of timber for future supply it is necessary that cutting should be deferred.

- (c) Where it is necessary to remove the timber in order to prevent the spread of insect depredations or injury from other causes.

5. Every State accepting the provisions of the Federal act should itself have enacted legislation:

- (a) Which provides adequate fire laws with suitable penalties for violation thereof; and

- (b) Which not only prohibits the violation of such rules and regulations as might be prescribed by the State and the Secretary of Agriculture in respect to the cutting of timber or the removal of any products thereof, and provides a penalty for such violation, but prohibits the shipment and sale of forest products manufactured from timber cut or worked in violation of such rules and regulations.

- (c) Which establishes an adequate administrative machine for making the laws effective, and appropriates funds to meet the conditions of co-operation.

6. Federal participation should be based upon the precedent of co-operation with the States in policies of

education and development and upon the commerce clause of the Constitution. The Federal act should prohibit from interstate shipment any forest products cut or removed in violation of State law. (Ref. Act prohibiting shipment of intoxicants from wet into dry states.)

7. The State Forester, or other official with corresponding authority, should be charged with the responsibility of administering the law. He should be appointed to a position in the Forest Service in order to exercise the authority granted to the Secretary of Agriculture. The police powers of the State should be extended to the necessary Federal employees. Administrative supervision of the work should be exercised by the Forest Service.

8. The expenditure of Federal funds should be authorized on the basis of the Federal Government paying not to exceed one-half of the cost. The remaining half

would be paid by the States either from their general funds or from special funds raised by tax levies, such as the timberland tax in Maine, the severance tax in Louisiana, and the compulsory patrol tax in Washington and Oregon.

Any Federal funds which might be necessary for the purposes of compensation described in paragraph 4 should be carried in a companion act having in view primarily the acquisition of forest lands by the Federal Government.

9. In consideration of the Federal co-operation and aid offered under the plan, any State which accepts it will be urged to enact legislation that will relieve standing timber from burdensome taxes by placing a nominal tax on the land and deferring the tax on the timber until cut.

A DISCUSSION OF METHODS

BY R. S. KELLOGG

SECRETARY, NEWS PRINT SERVICE BUREAU

THERE is no doubt about the necessity for a national forest policy and that it should be speedily inaugurated if we are to have anywhere near adequate timber supplies in the not very distant future. I am heartily in accord with the discussion and the intention to keep the matter before the public until the way is paved for the beginning of the solution of the problem. Anything that I may say, therefore, is a criticism of methods and details and not as opposition to the general purposes, with which I am in sympathy.

After giving the matter very serious consideration, I am unable to approve most of the nine provisions set forth in Forester Graves' statement on the principles of legislation requiring the practice of forestry on private lands. I don't believe that it is either practical or expedient to compel the practice of forestry upon private lands through the interstate commerce provisions of the Constitution:

First, because as shown in a matter upon which there is so much public sentiment as that of child labor, the attempt to accomplish desirable reforms through indirect means has twice fallen down; and

Second, because a coercive program of this sort would immediately alienate and render hostile a large proportion of the timberland owners, thus demonstrating once more the statement made a long time ago by high authority that "forestry is practiced everywhere except in the woods."

In my judgment it is not practicable to line up all the timber states in the multitude of details that program of "mandatory forestry" requires. Even in the one single matter of forest taxation—concerning which foresters and timberland owners have been in substantial agreement—little progress has been made after years of agitation. How much longer will it take to make progress in matters in which foresters and timberland owners

are in opposition? As a matter of fact, we are now coming to see that the States are very loath to make tax concessions to any one enterprise or form of industry. and while I am in entire sympathy with the suggested changes in forest taxation, I still carry in the back of my head the idea that after all if forestry is a business proposition it must pay dividends under business conditions.

Politics always plays havoc with forestry. There would be no limit to the trouble that would result were forestry made compulsory upon the private owner through enactment and regulation by Congress and forty legislatures.

It seems to me that the time has come when the professional foresters of the United States should be frank enough to acknowledge what those who have had practical experience saw long ago, namely, that the growing of large sized timber of the ordinary commercial species is an operation too long in time, too hazardous in risk, and too low in rate of return to attract private capital, and that an attempt, national or State, to force private capital by legal enactment to engage in undertakings that are not profitable is doomed to failure. Forestry must be economically sound or it will not succeed.

My suggestions of constructive nature are:

First: A timber census and land classification to determine what we have in the way of present supplies and the areas which may be properly classified as affording opportunity for future and permanent supplies.

Second: A great enlargement and extension to all appropriate parts of the country of the purchase of cut-over lands, for which ample precedent has been established in the White Mountains and Southern Appalachians.

Third: Much more vigorous and general extension of Federal co-operation in fire prevention along the line of

the Weeks Law, coupled with such additional measures as may seem best in the different States to reduce the fire hazard and afford opportunity for natural reproduction. The States can go a long way in fire control and the mandatory principle can be applied here much more successfully than it can be applied to either cutting or reforestation operations on private lands.

Fourth: The acquirement of a reserve supply of merchantable timber in the West through the outright purchase of timberland financed by the issuing of timber

bonds or perhaps the carrying of a reserve supply in private ownership through some form of co-operation with the State and national governments.

I am just as strongly in favor of a great increase in the area of publicly owned timberland (national, State or municipal) and an increase in the scope and effectiveness of fire prevention measures as I am opposed to either Government operation of saw mills or the placing of compulsion upon the private owner to grow timber upon his land in case he is not so disposed.

PENNSYLVANIA'S OPINION

BY GEORGE H. WIRT

CHIEF FOREST FIRE WARDEN OF PENNSYLVANIA

"WE HAVE VISED THIS REPLY, APPROVE IT, AND HAVE DIRECTED THAT IT SHALL REPRESENT THE ATTITUDE OF THE PENNSYLVANIA DEPARTMENT OF FORESTRY."—ROBERT S. CONKLIN, COMMISSIONER OF FORESTRY.

THERE is no question in my mind as to the necessity for a national forestry program, and I see no reason why such a program should not be worked out immediately. This program should be preceded by a short and concise statement, setting forth just what is necessary to be accomplished in order to provide the economic factors which can be obtained only by a rational handling of the forest areas of the country, and reasons why these things must be provided for as indicated by the present demands for forest products and the present inability to have these demands satisfied.

Necessarily, the methods by which the end in view may be accomplished will differ in different states and in different forest regions. In the first place I believe that the most essential factor in the national program must continue to be the educational work. I cannot endorse your statement to the effect that the education of the last twenty years is practically without result. We have had forestry education in Pennsylvania since 1870, and I am convinced that the results are more than commensurate with the efforts put forth. If any fault is to be found it is with the lack of method, organization, and persistency in educational activities and with the inappropriateness and generality of the material used by national, state, association, and private forces.

My first suggestion, therefore, in the national program is for a co-operative scheme by reason of which the national, state, association, and private educational activities may be made effective and kept continuously so. The foresters of the country do not need to be persuaded, because of the facts which they have at hand and with which they are familiar. When the facts which we have are made common knowledge, there will be little or no question as to the outcome.

Along with the educational campaign, the state and nation must collect exact information in order to back up the claim for a continued forestry activity. We must have more complete and definite information as to the actual amount of timber available and the amount of timber growing or capable of being grown in the country. There must, also, be continued researches

which will lead to the conservation of present supplies and the bringing of wood growers and wood users together satisfactorily.

Both state and nation may continue as fast as their educational campaign will produce means, to extend public forests and to manage them properly. They must also recognize the community interest in the protection of forests and work out to the best possible advantage necessary means for helping the timber owners to protect the forests from fire and destructive agencies. The tax question also must be solved.

This leads directly to the matter of legislation. There must be some law, and, while it is possible in some cases to obtain satisfactory laws without the support of a public understanding the necessity for the law, yet such cases are rare and where such law is obtained its enforcement is very unsatisfactory. So in each part of a national program we are brought back to the necessity for an educational campaign, not for a short period of time but continuously.

I cannot say that I endorse a program which implies upon the part of the national government anything more than what may be necessary to assist the states to do their work satisfactorily. The present co-operation under the Weeks Law might be extended for the protection of forests from fire. I can see no reason for national legislation working to the control of timber cutting within the states, nor do I see any necessity for the national government spending money within any of the states in connection with farm woodlands, except that it might be specifically stated within an amendment to the Smith-Lever Act that the state colleges which receive national funds under this act must assist the farmers in the management of the same as a part of the general farm education required.

With respect to compensation of forest owners for what are distinctly protection forests, I would say that this ought to come under the forest purchase laws either of state or nation and such lands should be bought outright under the right of eminent domain, if necessary, without necessitating the review of private operations.

It strikes me that the plan to enter the various states under a co-operative agreement upon a fifty-fifty basis other than for educational purposes and for what may be distinctly of national value in the protection of streams affecting several states, is unwise.

I also consider it extremely unwise to create an organization such as would be created under item No. 7 of principles of legislation. Each state forestry association would necessarily be under obligations to the national officials.

CONTROL OF GROWING FORESTS

BY ALFRED GASKILL, STATE FORESTER OF NEW JERSEY

BEYOND all question there is need for serious consideration of the forest situation in this country.

Though that situation is in no essential way different from what it has been for years, the necessity for effective action is accentuated by the evidence, now clear to every observer, that there is an insufficient replacement of the waning store of timber in this country.

What should be done cannot be decided offhand, or by any man. A full discussion of the conditions, opportunities, and needs in each section of the country must precede the formulation of a policy.

A policy to be truly national must have in mind the necessities of the nation as a whole, yet with full recognition of the facts that the greater part of the forest lands in this country are in private possession and under state, not federal, control.

The discussion of the problem thus far has seemed to confuse the situation as represented by the stumpage holders, chiefly in the West and South, who are overloaded, and as represented by the public interest in growing, as distinguished from mature, forests. The first condition should be resolved by economic, chiefly financial, measures; the second demands the best thought of every forester, to the end that the next generation shall have enough lumber.

And I cannot agree with some foresters that the lumbermen have no interest in the question. That their interest is largely, or solely, financial is a fact, but present conditions must change radically before lumbering can become localized and permanent. So long as virgin timber remains it will be an attraction to exploiters, and I can see no escape from the conclusion that we must suffer the exploitation of most of our virgin stands before silviculture finds opportunity to take hold. I have never believed, and do not now believe, that for-

estry can play any large part in lumbering operations dealing with virgin timber.

It strikes me that the most important service the national government can render in the national program of forestry is to act as a clearing house for the various activities of the states and to keep all of the foresters informed as to national and local conditions, so that the officials of each state may have at hand information which may be of value in avoiding errors and in taking advantage of methods which have proved to be successful, and to continue such investigations as it is impossible for any state to continue by itself.

The proposal lately made that forest owners be compelled to handle their properties under the advice of foresters is of doubtful wisdom. Desirable as it is to make the nation's stock of high grade lumber last longer than it now promises to last, there seems to be no argument to support the proposition that property interests in standing timber shall be sacrificed to a hope rather than a promise, much less a guarantee, that what is spared now can be realized on after a while.

If this view is radical it springs from a conviction that there must be a greater assurance than there now is in any part of the country that an investment in growing timber—not mature timber, is a safe investment. Before we can approach the owners of timber lands with any chance of securing results, before we can hope to impress legislatures and publicists with the reasonableness of our program, three things must be established; *first*, the fitness of a given area for continued use (through one rotation at least) as forest; *second*, security against destruction; and *third*, assurance of the total, or ultimate, tax levy.

The situation is critical but not hopeless by any means; a constructive policy probably can be based upon *encouragement* to woodland owners by the Federal Government and by the states; upon active *instruction and help* to the smaller woodland owners—similar to that furnished farmers; upon *fire protection*; and upon a modified tax practice; all of which will tend to establish an insurable interest in growing forests.

I emphasize the phrase "growing forests." To my mind the key of the situation is there—not in control over forests already mature, and which under every silvicultural law should fall to the ax as speedily as possible.

TO HELP in meeting war needs, the United States Forest Service in 1918 continued its efforts to secure full utilization of the forage resources of the National Forests. In 1917, because of the war, 23,000 more cattle and 71,000 more sheep were placed on the National Forests of California than had ever been grazed on them previously. In 1918 the numbers were still further increased by 18,000 cattle and 114,000 sheep.

THE tallest trees of the United States, says the *Canadian Forestry Journal*, are the California redwoods or the Douglas fir. Both claim the distinction of being the tallest, and it is an even match between them. A maximum of about 350 feet is the greatest, though a little more than that has been claimed. There is no question that in trunk diameter the redwood, that species known as sequoia, is the champion.

THE SEVENTEEN-YEAR LOCUST

BY DR. R. W. SHUFELDT, C. M. Z. S.

(PHOTOGRAPHS BY THE AUTHOR)

THE din created by the droning hum of an immense army of seventeen-year cicadas (they are not locusts, though generally called locusts) has been heard coming from the trees and bushes in many places during the past several weeks. The continuous hum of millions of these curious insects is heard throughout the entire day, from early morn until sundown.

From the ninth to the twelfth of May, especially where there are mostly maples and oaks, there appeared perfect hosts of curious, dark amber-colored creatures that helplessly crawled about, each making an effort to reach something that it could creep up upon. Mingled with these were many "locusts" of the kind here shown in Figure 2. Thousands of the helpless horde were crushed underfoot. In some cities and towns the sidewalks were absolutely slippery with the mashed bodies of the victims, while hundreds of thousands of others had escaped this fate through climbing up on the trees,

fences, and other supports in their neighborhoods.

These "bugs" do not bite or sting, and they fall into a very interesting family of insects known as the *Cicadidae*, being popularly called locusts, cicadas, and sometimes harvest-flies. However, they must not be in any way confused with the various species of grasshopper-like insects that are the true locust, such as our American locust (*Schistocerca americana*), or with those that during various periods of history formed the great flights in the Old World. Such phenomena are more or less fully described in some of the very oldest works we have, as the locust swarms of ancient Egypt. Many thoughtless people take our seventeen-year cicada to be identically the same species; and, too, as a rare occurrence, we still meet with some pious, old dame who shudders at the sight and sound of these harmless hordes, drawing a long breath when the "flight" is over and the people have escaped the punishment following upon some



Fig. 1. DRIED, EMPTY "SKINS" OF THE SEVENTEEN-YEAR CICADA, ATTACHED TO THE LEAVES AND FLOWERS OF THE MAPLE-LEAF VIBURNUM. THERE IS ONE PERFECT INSECT NEAR THE MIDDLE OF THE PICTURE. SLIGHTLY REDUCED.

willful misdemeanors of the nation. Of these cicadas there are a number of species, all looking very much alike, some being very large and some very small, with color in general agreement; their common appearance is well shown in the cuts illustrating this article. Several species are found in Europe and several still different kinds in the Americas. All true cicadas belong to the Order *Hemiptera*, and constitute the typical genus of the family *Cicadidæ*. All are of comparatively good size, the males having under their wings peculiar little "drums" wherewith they make the humming note so familiar to all, while the female has a most interesting history. She deposits her eggs from about the end of May through

the entire month of June; these are discovered to be in pairs in the twigs of many kinds of oaks and other trees, and are very small, spindle-shaped objects.

In the case of this seventeen-year cicada, the larvæ hatch out in about six weeks from the time the female lays the eggs; they then immediately fall to the ground, into which they burrow, to spend the next seventeen years of their lives, remaining only a few days in the pupa stage. During all this time, their only food consists of the juices of the roots of certain trees, they being provided with the means of sucking the roots.

It has been shown that the female is quite indifferent to the kind of tree, shrub, or brush into the twigs of which she deposits her eggs. Often much harm is thus done to fruit trees, such as the apple and pear; and so severe is the treatment sometimes and the number of punctures sustained, that the death of the tree follows. Peach trees have been thus destroyed, proving the cicada to be, in many instances, a harmful insect. When cherry trees are selected, the exuding gum usually seals in the egg or young, and they never come to anything. Some females show wonderful fecundity, the line of minute

punctures for the eggs on the twig often having a length of more than two feet.

At the time these cicadas laid their eggs in the grooves they cut in certain trees, along towards the middle of June, the effects very soon became apparent. Especially was this true in the case of all the species of oaks, chestnut oaks, and sassafras shrubs. The big twigs thus operated upon by the insect had all the leaves beyond the line of punctures die and turn a deep tan color. Some large oaks thus wounded presented a mottled appearance at a little distance, the general body of the tree retaining its normal dark green foliage, with the dead, brown patches irregularly distributed all over it. In general,

the tree sustained no other injury.

Mr. S. S. Rathvor, of Lancaster, Pennsylvania, gives interesting facts in the life history of these cicadas saying, in part, referring to the eggs and young of the seventeen-year Cicada; "many people who endeavor to study the insect fail to produce the young by keeping branches containing eggs in their studios.

I so failed in 1834 and 1851, and indeed I have never heard that any one has suc-

ceeded in that way who has kept them for any length of time. In the brood of 1868 the first Cicadas appeared in a body, on the evening of the second day of June. The first pair *in coitu* I observed on the 21st, and the first female depositing on the 26th of the same month. The first young appeared on the 5th of August. All these dates are some ten days later than corresponding observations made by myself and others in former years.

"On the 15th of July, I cut off some apple, pear, and chestnut twigs containing eggs, stuck the ends into a bottle containing water, and set it in a broad, shallow dish also filled with water, the whole remaining out of doors exposed to the weather, whatever it might be. The young continued to drop out on the water in the dish



FIG. 2. SEVENTEEN-YEAR CICADAS, WITH ONE EMPTY SKIN-CASE. WASHINGTON SPECIMENS OF 1919, FROM LIFE AND NATURAL SIZE. NOTE THE DISPOSITION TO ADVANCE THE FORE-PAIR OF LEGS.

for a full week. I could breed no Cicadas from branches that were dead and on which the leaves were withered, nor from those that from any cause had fallen to the ground; this was also the case with Mr. Vincent Bernard, of Kennet Square, Chester County, Pennsylvania. After the precise time was known, fresh branches were obtained, and then the young Cicadas were seen coming forth in great numbers by half a dozen observers in this country. As the fruitful eggs were at least a third larger than they were when first deposited, I infer that they require the moisture contained in living wood to preserve their vitality. When the proper time arrives and the proper conditions are preserved, they are easily bred, and indeed I have seen them evolve on the palm of my hand. The eyes of the young Cicadas are seen through the egg-skin before it is broken."

Some thirty-five years ago, the late Professor Charles Valentine Riley, an entomologist of great distinction, published an excellent cut, giving an upper view of a seventeen-year cicada, with its wings spread; two views of the pupa; a twig showing the position of the eggs, and a larva. They were all the size of nature, and the illustrations appeared later on in many kinds of publications; but for some reason the figure of the larva was omitted—perhaps for the reason that it was not quite accurate.

The writer believes it was Professor Riley who first discovered that there was in the South a thirteen-year cicada; he always believed that the seventeen-year broods were northern and the thirteen-year ones southern—the dividing line being at the thirty-eighth degree of latitude, approximately, overlaps taking place at certain points. He predicted accurately the probable emergences for certain years, and the insects did not fail him but put in an appearance in millions on schedule time.

Professor Riley pointed out that the development of the larva is extremely slow, being not more than one-fourth its full size when six years old. As it moults more than once a year, there must be some twenty-five or thirty changes of its skin when in its subterranean abode, which is not over two feet below ground during the first six or seven years of its existence. At this time it is in an oval cell which Professor Riley showed was more often away from roots than near them. Packard states: "Yet it can descend to great depths, one writer stating that he found it 20 feet below the surface. As the time approaches for the issuing of the pupa, it gradually rises nearer and nearer to the surface, and, for a year or two before the appearance of any given brood, this pupa may be dug up within one or two feet of the surface."

During the present invasion of these insects, the round holes where these cicadid nymphs came out were extremely numerous around many trees and in pathways through the woods. Upon several occasions, when turning over fallen logs, the writer discovered the pupa had made a chimney closely resembling the corresponding achievement of the common crayfish; this has been noticed by other observers. Out at Linden, Maryland,

the twigs of the lower limbs of hickories, oaks, and maple-leaved viburnums were seen to be literally covered with the empty cases of the nymphs or pupæ of this cicada (Fig. 1). They also covered small cedars not over two feet in height, as well as many bushes. This was upon the 25th of May, 1919. A few of the perfected insects were distributed through these interesting and very striking groups, and the "music" of the latter had

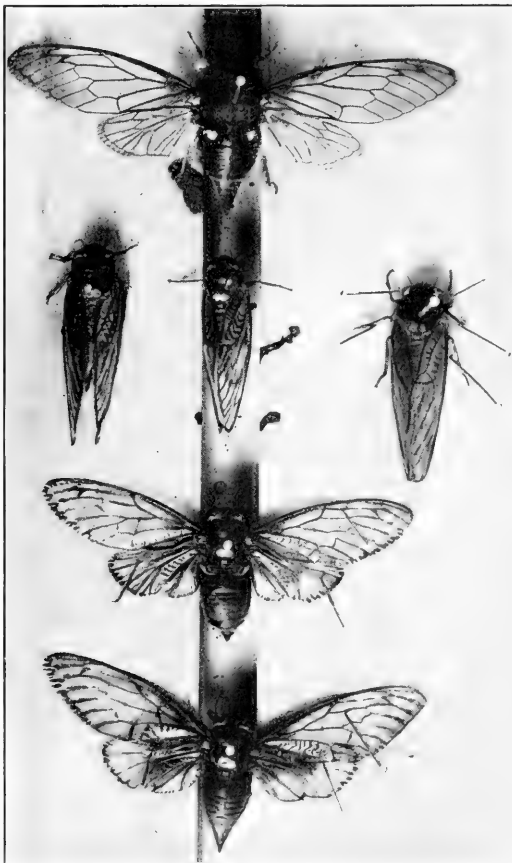


Fig. 3. DEAD CICADAS PINNED OUT ON A "SPREADING BOARD" FOR PRESERVATION IN A COLLECTION. THE LARGE UPPER ONE IS THE COMMON FORM OR "HARVEST-FLY" OF THE EAST. NATURAL SIZE. WASHINGTON SPECIMENS, COLLECTED BY THE AUTHOR (1919).

just begun in the trees and shrubbery the day before.

What strikes us first upon looking at one of these seventeen-year cicadas, when it is alive and in full health, is its beautiful coral-red eyes, set off by its dark greenish-black body. All about the base of its wings and costal margins of the same, the color is of a deep, rich, and very brilliant orange. The sexes are distinguished by the presence of the ovipositor in the female, which is quite conspicuous.

While this emergence was on, the writer collected over an hundred of these cicadas, with as many pupæ

and empty cases. They were carefully studied and also used for photography, the illustrations accompanying this article being made especially for it.

The nymphs dig out of the ground through the use of their strong and enlarged fore-feet, the matured insect subsequently emerging from a slit down the back. All of this is seen in Figure 1 through carefully regarding the several specimens. Sometimes we meet with cases where the insect died when only partly out of the case. In still others the wings crumple up, and the helpless insects crawl about on the ground. Probably there are also other kinds of deformities.

In flight, the seventeen-year cicada is not at all rapid, nor is that flight, as a rule, long sustained. Most often it is in a straight line or on a long curve, either ascending or descending. They are very loath to move in a rain-storm, or when wet from any cause. There is no trouble in catching the adult insects, and when held in the fingers they commonly emit a loud, humming noise; should the wings be free to move at such times, they whirl them rapidly, thus adding to the fuss they make. On even ground, this cicada walks with great deliberation, bringing the fore-pair of legs to the front with marked cicadian dignity at regular intervals. Frequently, when on the ground, one may get over on its back, when it will violently whirl its wings in its efforts to right itself again. In warm, dry weather they are far more active than when the air is chilly and damp.

When observing children capture these "locusts" they will call your attention to the W near the upper, outer angle of each fore-wing and with a dubious shake of their heads predict that a war is near at hand. This is backed up by inviting attention to the reddish color on the wings of our larger species of cicada, where this ominous W is also to be seen. As the *Cicadidae* have been in existence for a great many thousands of years, during which time millions of men have been slain in wars, this harmless superstition is hardly worthy of a smile. Strange to relate, however, we have many "grown-ups" among us who are firm believers in this and similar "signs."

This family of *Cicadidae* contains many other species besides the thirteen-year and seventeen-year ones; a larger one of the eastern United States is well known. It comes along during the "dog days" of summer or a little later, and its "song" is indicative of the approach of early autumn. Rarely do we hear more than one or

two of these together—in cities usually from the shade trees along the streets. The "song" has a definite beginning and ending, and is not a continuous hum as is the case with the seventeen-year fellow.

There are a number of tropical species; and out West a very cute little form, much lighter in color, that the writer has observed in thousands on the sage brush on the prairies. This probably is the one that Dr. Frank E. Lutz refers to in his work, a *Fieldbook of Insects*, when he says: "Of the genus *Cicada* (as now limited, *Tettigia*), the small *hieroglyphica* (Plate XXII.), with an almost transparent abdomen, may be found in pine barrens, and is our only species." (P. 84.)

Kirby, in his *Text-Book of Entomology*, figures *Thopha saccata*, Amyot, and says that it is an Australian insect, remarkable for the large drums of the male. It is rusty

brown; the thorax is banded with black and yellow, and the abdomen is black." From tip to tip, this giant among the *Cicadidae* measures five and a half inches.

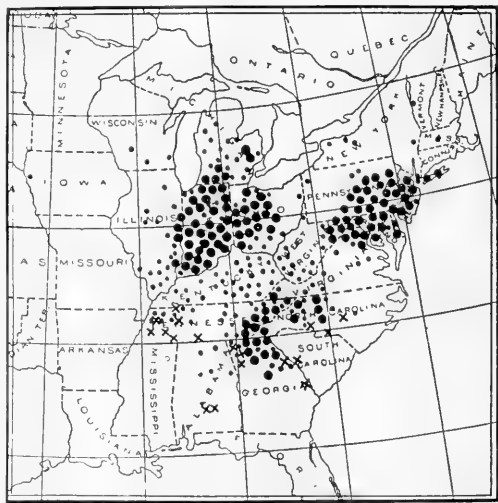
Three very fine species inhabit China, and others are found in South Africa. The big one of the East Indies (*Dundubia imperatoria* Westw.) measures over eight inches across the spread wings!

Kirby remarks that the "Cicadas are improperly called "locusts" both in America and Australia. In countries where they abound, the larger species keep up a perpetual chirping, and they and other insects make the woods resound with their song at almost all hours of the day

and night. Hence, I have been assured by travellers who have spent some years in the Tropics, that nothing struck them so much on their return to England as what seemed the death-like stillness of our woods, and that it was months, or even years, before they were able to divest themselves of the impression that it was always winter." Were such travelers able to hear the din created by the thousands of the seventeen-year cicadas "singing" in concert in the trees, they would most assuredly have but slender grounds for such complaint.

One of the very best accounts of our cicadas is given us by Dr. L. O. Howard, in his well-known *Insect Book*, fully illustrated by many of Riley's excellent cuts. These last include the "young larva" of the seventeen-year species, which stands in evidence of Doctor Howard's belief in its accuracy.

"The ultimate fate of this interesting species," says this eminent authority, "is undoubtedly extinction, and its



MAP SHOWING THE "HOSTESS" STATES—TERRITORY IN WHICH THE PERIODICAL CICADA (LOCUST) APPEARED IN 1919. LARGE DOTS INDICATE DENSE AND SMALL DOTS SCATTERING COLONIES.

numbers are rapidly growing less. One of the comparatively few insects upon which the English sparrow feeds with avidity is the periodical cicada, and many thousands of them are destroyed by sparrows each time they make their appearance and before they lay their eggs." One interested in cicadas should certainly read this valuable account by Doctor Howard. According to Lutz, the adults live only a week or so, "to recompense them for the long period of preparation."

Further on the same author remarks that "there are a score, or more, of different broods, each of which has a rather definite—often restricted—distribution and time of emergence. Suppose there are three such broods in your neighborhood. One of them (that is, the adults) may have appeared in 1911; its next appearance would be 1928. Another might be 1916, 1933, and so on. As a matter of fact, these are actual broods, although they may not be the ones of your neighborhood. However, the example shows that we may have seventeen-year cicadas oftener than every seventeen years, to say nothing of the possibility of laggards or extra-spry individuals, in various broods, which do not appear on schedule time."

It has been pointed out that many thousands of these cicadas came forth on the streets in Washington. This,

be it noted, could only happen where the ground, for seventeen years or a little more, had not been sealed over, either by some structure or other having been erected upon it, or by the making of cemented sidewalks and impenetrable roadways. As Washington very extensively encroached upon its former environs during the time this brood of cicadas were enjoying the seventeen years of subterranean existence, many hundreds of acres being sealed over, it is apparent that all the cicadas in those areas perhaps millions of them, could not come to the surface at the appointed time, and thus perished at the points where they arrived at such impassable barriers. It is claimed that this factor of destruction will, in time, exterminate this interesting insect—an idea that surely is quite unbelievable; though to a certain extent it may keep their numbers down, as does the extensive warfare waged upon them by the "English Sparrows" in and about our cities.

Extinction or no extinction; war or no war; sparrows or no sparrows—in the month of May, 1936, common reckoning, we shall, with absolute certainty, see an emergence of our seventeen-year cicada where the present hordes have appeared.

DR. FERNOW, DEAN OF FORESTERS, RETIRES

DR. B. E. FERNOW, Dean of the Faculty of Forestry, University of Toronto, retired on July 1. Dr. Fernow intends to return to the United States and, if his health permits, to continue his labors in authorship which have already won him much distinction. The success of the College of Forestry at Toronto mirrors Dr. Fernow's unsparing giving of himself for the advancement of the science of forestry in Canada. One cannot over-emphasize the discouragements he met and overcame in founding a new and unfamiliar branch of technical training, the youngest of the engineering professions. As a Director of the Canadian Forestry Association, Dr. Fernow was a great believer in educational propaganda and assisted it at every opportunity.

He became Chief of the Division of Forestry, United States Department of Agriculture, in 1886, a position which he filled until 1898. In addition to his official work, he was a constant promoter of all biological investigations leading to a broader understanding of the principles of forestry. In 1883 he was elected secretary of the American Forestry Association, and also held the position of chairman of the Executive Committee, and finally first vice-president of that organization. The degree of Doctor of Laws was conferred on Dr. Fernow by the University of Wisconsin in 1897. He took up his duties at Toronto University in 1907.

HOMES built of wood were practically the only structures unscathed in the severe earthquakes which devastated parts of the island of Porto Rico, according to reports made to the National Lumber Manufacturers' Association—a high tribute to the durability of this forest product in building work.

DOUGLASS "KILLED IN ACTION"

A REPORT from the Adjutant General practically confirming the death of Lieut. C. W. H. Douglass reads as follows:

"Lieut. Charles W. H. Douglass, Signal Corps, previously reported missing in action since June 11, 1918, now reported killed in action, same date." No further details are available.

Lieutenant Douglass was a graduate of the New York State College of Forestry and at the time of his enlistment in the Aviation Service, was associated with P. S. Ridsdale, editor and secretary of the American Forestry Association. His loss is keenly felt.

GRADUATES OF THE NEW YORK STATE COLLEGE OF FORESTRY GRANTED AMERICAN-SCANDINAVIAN FELLOWSHIP

MR. HENRY M. MELONEY, of Bordentown, New Jersey, who was graduated from the New York State College of Forestry, at Syracuse University, with the degree of B. S., in June, 1918, has just accepted appointment to a technical fellowship for the study of forestry, lumber, and paper and pulp manufacture in Sweden, under the American-Scandinavian Foundation. Ten college and university men from America will be sent to the Scandinavian states under the American-Scandinavian Foundation for study and research. Two of these fellowships are in forestry and the others in mining, electrical engineering, etc. The fellowships carry \$1,000 and are of one year's duration. Mr. Meloney is planning to leave for Sweden in August and will specialize in lumbering and logging engineering.

Forestry for Boys and Girls

by E. C. Cheyney

THE PINE WOODS FOLK

SQUEAKY FINDS TWO MORE VANDALS



SQUEAKY liked to gossip about as well as anyone and he did a good deal of it when he had a chance, but there was nothing lazy about him. When there was any work to do he settled right down to business and finished the job. So when Mrs. Squeaky told him that she had located a big supply of acorns he was as anxious as she to transfer them to their store room.

"Where are they?" he asked as they bobbed off through the woods together.

"In the old hollow maple stub, right on the ground."

Squeaky stopped very suddenly and looked at her with doubt in his eye. "But Johnny Woodmouse lives there," he exclaimed.

"No, he doesn't," Mrs. Squeaky replied, proud of her news. "Porky told me this morning that Mrs. Woodmouse went out on the snow one night last winter and the owl caught her."

"But he did not catch Johnny and the children?" he asked, still hesitating.

"No, but Johnny left as soon as the snow melted, to look for another wife, and he took the children with him. They have been gone six weeks."

Squeaky no longer hesitated. He raced along with his smart little wife to the old maple stump. She disappeared between two of the big roots and he found a small hole between them that led into the big hollow stump. There must have been a bushel of acorns on the floor of the hollow.

"I did not even know that there was a ground hole into this stump," Squeaky exclaimed admiringly.

"I found a tiny little hole there in the rotten wood," Mrs. Squeaky explained proudly, "and dug it out. You see, the acorns came from up there."

Squeaky looked up and saw a small hole leading into the hollow above where Johnny Woodmouse had lived. All the acorns had run down through this hole. They started to work at once. With an acorn in each cheek and another in his teeth, Squeaky started out, but

he could not make it. He had to take an acorn out of one cheek before he could get through the hole. He made a great fuss about it, but finally went on with the two acorns. While he was gone Mrs. Squeaky, who was of a more practical turn of mind, cut the hole a little larger so that her packed cheeks would go through.

Squeaky was on his second trip when he saw a junco hopping along apparently picking something out of the air every little while. Squeaky's curiosity was aroused at once. What was the junco eating? He went over that way and found that the junco was picking the seed caps off of the tiny little pine seedlings and taking the top off of the seedlings with them. Squeaky was very much excited, but he could not talk with his mouth so full. As it was against his principles to lay down a load, he hurried home with it as fast as he could go and tore back to the junco.

"Hey," he called as soon as he was within earshot, "do you know that those are pine seeds that you are eating?"

The junco looked a little disgusted. "I thought they tasted like them," he replied.

"Well, that's what they are," Squeaky cried. "They stick on top of the seedling when it comes out of the ground. Every time you pull off one of those you pull off the top of the seedling with it and kill it. We shall never have any pine trees if you go around everywhere doing that."

The junco looked at him curiously. "You eat the seed, don't you?" he asked.

"Certainly," said Squeaky, "but—"

"Well, then," said the junco as he flew away to another patch of seedlings.

Squeaky was almost stunned. He had already scolded Porky, Cottontail and the junco for destroying pine trees and now he had suddenly discovered that he had probably kept more pine trees from growing than any of them. Probably had destroyed more than anybody else, except Chatter Box.

It made Squeaky very thoughtful, but it did not stop him from hurrying on to help Mrs. Squeaky, and by evening the whole bushel of acorns was safe in their store house.

THE GULLS AND TERNS

(Family Laridae)

BY A. A. ALLEN

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

TO THOSE who go down to the sea, there is no bird more familiar than the sea gull. It matters not that there are fifty different kinds of gulls in the world with as many different names. All of the long winged graceful white birds that follow the ships the world over, or congregate in large flocks in the harbors, are everywhere called sea gulls and always will be. Absolute masters of the air they are, for no storm is so severe that they cannot still be seen, now circling

with scarcely a mark of any kind. Immature gulls are uniformly darker than the adults, being dusky or grayish, changing gradually during the first two or three years to the plumage of the old birds.

Gulls vary in size from that of a pigeon to that of an eagle although they are always more slender than the latter. As a group they are larger than the terns though a few of the terns are larger than the smallest gulls. The majority of terns are about the size of slender



Photograph by Herbert K. Job

AN AVIAN SNOW STORM

Royal and Cabot's terns nesting. Breton Island Reservation, Louisiana.

high overhead, now gliding close to the waves, now sailing apparently straight into the wind without a movement of the wings. Sometimes they sail for hours by the stern of the ship taking advantage of the air currents and never moving their wings except to alter occasionally the angle at which they are held. Again they are seen tossing about on the waves for they have webbed feet and can swim like ducks.

The majority of gulls are pure white except for pearl gray mantles and black tips to the wings, but some have the mantle darker, others have the head black during the summer, while still others have the entire plumage white

pigeons but some are not much larger than the largest swallows. Indeed they are sometimes called "sea swallows" because of their long pointed wings, deeply forked tails, and light, airy flight.

Terns do not often sail like the gulls but few birds excel them for gracefulness. With measured strokes of the wings, almost suggestive of the motion of a butterfly, and with their bills directed downward as they watch the water, they beat back and forth along the coast hunting for small fish. Once a flock of terns locates a school of fish, a scene of intense animation follows. The buoyant, rhythmic flight gives way to a series of daring plunges

and they dart from a considerable height into the sea, spearing the small fish with their pointed bills. In this method of feeding they differ entirely from the gulls which have hooked bills and feed upon dead fish that they find floating on the surface.

Gulls and terns are much alike in their nesting habits for the majority of species build crude nests or lay their eggs in simple depressions in the sand or on the rocks, with little or no pretense at nest building. In this respect and also in their eggs, which are olive or drab in ground color, rather heavily marked and sharply pointed, they are quite similar to the sandpipers and plovers. Indeed they resemble the shorebirds in other respects and in many anatomical characters as well so that most ornithologists today put all of them together in one major group or order.

The commonest and best known of the twenty-five species of gulls found in North America is the herring gull. It is found throughout the northern hemisphere, nesting from northern United States and northern France northward, and wintering from the southern part of its breeding range south to the Gulf of Mexico and the Mediterranean. It is common in winter in New York harbor and in other harbors, following the ferries and swooping down to pick up pieces of bread or refuse thrown into the water. It follows also the garbage scows in dense clouds and is everywhere a valuable scavenger. In the interior the herring gulls are common on all of the Great Lakes

and larger bodies of water that do not freeze over, and whenever the ground is not covered with snow, they make sorties to the uplands, often long distances from water, where they find grasshoppers, beetles, and grubs. Gulls always roost on the water, however, so toward night they can

be seen returning to the lake just as they left it in the morning. While on the lake, in addition to picking up dead fish, they occasionally rob the loons and mergansers. Sometimes a dozen or more gulls hover over the spot where these birds are

fishing waiting for one of them to make a catch, and then they will swoop down at it before it has time to swallow its prey. Usually the gulls are so persistent that the diver finally drops the fish, and the gulls fall upon it and begin fighting among themselves. The herring gulls



Photograph by G. A. Bailey

A TERN POST

A black tern in full plumage. In this plumage it belies its name.



Photograph by G. A. Bailey

THE BLACK TERN IN SUMMER

In this plumage the head and underparts are black—an unusual plumage for this family of birds.



CAMOUFLAGE IN NATURE

Young gulls and terns are almost impossible to see against the lichen covered rock. Here are three young herring gulls.



Photograph by G. A. Bailey

A SIMPLE HOME

The gulls build crude nests and the terns usually none. This is the nest of a Caspian tern on an island in Georgian Bay.



Photograph by Herbert K. Job

"AN OFF HOUR FOR HOUSEKEEPERS"

Laughing gulls, Breton Island Reservation, Louisiana

usually select a rocky island for a nesting site and pull together small piles of drift weed for nests. They usually lay three eggs which vary from drab to olive or bluish white in ground color, irregularly spotted with lilac and shades of brown. The young birds are covered with down when hatched, and, like the adults, are able to swim. They are cared for by their parents, however, until they learn to fly. Their downy coat is mottled with buff and gray so that when they crouch they are almost invisible against the lichen covered rocks.

A somewhat smaller and more migratory species is the ring-billed gull which scarcely can be distinguished from the herring gull at any distance. It migrates as far south as Mexico and Central America and rarely winters as far north as New York State. The chief difference between it and the herring gull is that in the adult plumage, it has yellow legs instead of pink and has a black band across its bill. The immature birds can be distinguished at greater distances because the ring-billed gull has a pure white tail marked by a subterminal black band while the immature herring gull has half or all of the tail dark.

A somewhat smaller and more maritime species is the kittiwake, so called from its note. It has nearly the same pattern of coloration as the herring and ring-billed gulls with more or less black on the flight quills. Three larger species, the glaucous gull,

the Iceland gull, and the Kumlien gull are distinguished by the absence of black on the primaries. These are northern species found rarely on our coast in winter and they can be distinguished from one another only by experienced observers. A more distinctly marked large gull, in fact the largest of them all, is the great black-backed gull which differs from all the others in having the mantle a deep slaty black. It is a maritime species and seldom visits inland waters.

The smallest of the North American gulls is the Bonaparte's gull which in its breeding dress has the entire head slaty black. It takes at least two years to acquire this plumage, however,

and it is worn only during the summer so that white headed birds are much more often seen. It is more migratory than the other species, nesting in the far north and seldom wintering north of the Southern States, many individuals continuing their winter roving to Mexico and Yucatan.

A more southern black-headed gull is the laughing gull which nests in the salt marshes along the coast from Massachusetts south to Venezuela, retiring in winter to the Gulf coast and even to Brazil. This denizen of the South is somewhat smaller than the ringed-billed



Photograph by Herbert K. Job

THE GREATEST OF ALL TRAVELERS

Arctic tern on nest This bird is said to migrate 22,000 miles a year Matinicus Rock, Maine



Photograph by Herbert K. Job

ON THE SEA CLIFFS

Kittiwakes, nesting on Great Bird Rock, Magdalena Islands

in North America. They are easily distinguished from the gulls by the points already mentioned but many of the species are distinguished from one another only by the closest observation. The commonest color pattern is similar to that of the gulls being largely white with pearl gray mantles, but in the breeding season all the typical species have the whole top of the head black. Most of



Photograph by Herbert K. Job

AN UNUSUAL PERCH FOR A GULL

Herring gull solicitous for its nest, Matinicus Island, Maine.

gull but considerably larger than the Bonaparte's.

In the Mississippi valley and west to the Rockies there is a very similar black headed species called the Franklin's gull. It is the least maritime of all the gulls, reaching the sea coast only during its winter quarters, which stretch from Louisiana to Peru and Chili. During the summer it frequents the prairie country feeding principally upon locusts and other insects, often following the plowman for the grubs that are turned up by the plough. It is this species that the Mormons believe saved their first settlers from starvation by consuming the black crickets which threatened to destroy all their crops. Indeed they have recently erected an elaborate fountain and monument in Salt Lake City dedicated "to the gulls which saved the early settlers from starvation."

Along the Pacific coast there are three common species, the glaucous-winged, the western, and the California gulls, which are not found in the east. They are white-headed species, not strikingly different from the herring gull.

Ten of the fifty species of terns known to science are found

them, likewise, have deeply forked tails. They vary in size from the least tern which is not much larger than a swallow, to the royal and caspian terns which are about



Photograph by Herbert K. Job

LIKE A MANTLE OF SNOW

Royal and Cabot's terns nesting, Breton Island Reservation, Louisiana.

the size of ringed-billed gulls. The caspian tern is a somewhat larger species than the royal and has a less deeply forked tail. It is likewise more northern in its distribution. The common tern (or Wilson's tern), the Forester's tern, the Arctic tern, and the roseate tern are all much alike being about fifteen inches long and having the typical tern coloration. They are, however, somewhat different in habits and distribution, the common tern being the most widespread and generally seen. Close observation will distinguish the Arctic tern by its grayish underparts and uniformly deep red bill, the common tern by its white throat and grayish breast, and bill, red only at the base. The Forester's tern can be distinguished by its pure white underparts and dull orange bill and the roseate tern by its delicate tint of pink on the underparts.

The Arctic tern is the most maritime of them all and is said to have the longest migration of any bird, some individuals nesting well within the Arctic Circle and some wintering well within the Antarctic, requiring an annual pilgrimage of about 22 thousand miles. The Forester's tern is more of a western species and is more marsh loving than the others, nesting in grassy marshes. The common and roseate often nest together on some of the islands off the Atlantic coast but the roseate is more southern of the two extending its breeding range to northern South America. The gull-billed tern is a nearly cosmopolitan bird but is found in North America only as far north as Virginia. It is quite easily identified by its short heavy bill and less deeply forked tail.

The least maritime of all the terns is the black tern which frequents the marshes of the interior. It is easily distinguished in its breeding dress by its black head and underparts but during the winter these are white and it is not so different from the other terns except that its upperparts are darker.

There are two tropical terns, the sooty tern and the noddy tern which are common on the Florida keys and some of the islands off the Gulf coast where they nest in colonies of thousands. The sooty tern can be distinguished from other terns by its black upperparts and the noddy tern by its black underparts, as well as upperparts, only the top of the head being white.

In the days when the feather trade was at its height, thousands of tern skins of all species were shipped to the New York markets and the breeding colonies all along the Atlantic coast were almost wiped out. Indeed even after some of the nesting islands were set aside as refuges and protected by wardens, hunters congregated in boats near the islands and baited the birds up to them. In this way they were still able to kill hundreds of them because the terns have the unfortunate habit of hovering over a wounded companion and returning again and again, even though shot at, as though they would succor him. It was not until through the efforts of the National Association of Audubon Societies and a few far-sighted Senators and Congressmen that the non-sale of plumage laws were passed. These laws forbade the sale of the plumage of native birds, and made it possible to save

the few remaining terns. Now the birds are beginning to increase and to nest where they have not been found for years. The least tern alone, seems unable to recuperate from the verge of extermination to which it was forced and it is still a rare bird all along the Atlantic coast where once it was extremely abundant.

CITY TREE PLANTING

ALDO LEOPOLD, secretary of the Chamber of Commerce at Albuquerque, New Mexico, tells how that city conducted a tree planting campaign which offers valuable suggestions to other commercial organizations. The first step was to appoint a committee of private citizens experienced in tree planting. This committee drew up a set of specifications embodying the consensus of their opinions as to the best species of trees to plant and when, the best size of stock, and the exact methods of shipment, storage, distribution, planting, and the after care which is necessary to produce the best results under the conditions existing in Albuquerque. The specifications were then published in the local newspapers, and private parties were asked to submit bids, giving the cost per tree for which they would agree to meet the specifications. On a given date all bids were reviewed by the committee, and those bidders whose prices were reasonable were investigated as to their personal reliability and experience and the reliability of the nursery with which they did business. Certificates of recommendation were then issued to all the bidders who, in the opinion of the committee, were fully qualified to do the work.

The committee then appointed a trained forester as inspector. The certificates of recommendation stipulated that any work not complying with the specifications as interpreted by the inspector would result in the forfeiture of the certificate of recommendation. All holders of certificates were then encouraged to proceed to solicit business in the regular manner of private contractors.

These certified contractors commanded the confidence of the public and were aided by an extensive advertising campaign. This was conducted by the Chamber of Commerce with the full co-operation of the local newspapers. Large numbers of trees were ordered by property owners who had in former years deferred tree planting because they were not satisfied with the service rendered by unregulated contractors. A total of over one thousand trees were planted, and so far 95 per cent of them are growing and doing well. Under the extremely difficult conditions obtaining in the Southwest, this is a very exceptional showing. The public is well satisfied. The annual planting of trees will be at least trebled, and the contractors state that they will never work under any other system.

A FOREST FIRE IS A REAL ENEMY

Carelessness causes many fires. Are you careless? Never leave your camp fire without making sure it is completely out. We won the war to defend Democracy. Must we now fight forest fires? Are you careful with fire in the forest? Burning matches cause fires. Break your match in two before throwing it away. If you discover a forest fire, put it out.

EDITORS TAKE UP FOREST MATTERS

NEWSPAPERS ANSWER CALL OF AMERICAN FORESTRY ASSOCIATION
AND OPEN COLUMNS TO DISCUSSION OF BIG QUESTIONS

ANATIONAL forest policy for the United States, "Roads of Remembrance," plans for reforestation in France, Belgium and Great Britain, and the planting of Memorial Trees, for all of which the American Forestry Association is campaigning, have received the hearty indorsement of the editors of the country.

In an editorial on beautifying the roads of the country the *Atlanta Constitution* outlines the suggestion of the American Forestry Association and says, "This is an excellent idea. The movement in all its phases is commendable and it is one to which the public should give hearty indorsement." The Association urges that County Units plan memorials of various kinds with the good roads in mind so the memorials be easy of access and that the roads for which millions are to be spent be marked with memorial trees. "The advantages of having highways set with trees are a great many," says the Worcester, Massachusetts, *Gazette*, "and few undertakings of so small comparative cost are calculated to give as big a return for the money invested as the planting of trees along the highways wherever such work is practicable."

Fruit trees are advocated for roadside planting by the *Portland Oregonian*, and so are nut trees. "This is an established custom in Europe," the *Oregonian* points out, "and a practice worth thinking about." The *Pittsburgh Post* praises the Boy Scouts for planting walnut trees and adds: "This is particularly timely in view of the warning just issued by the American Forestry Association that the country faces a timber shortage." The Columbus, Ohio, *Dispatch* says: "If the people of this country do not begin planting black walnuts they will make the mistake of their lives." The "*Haskin Letter*," a feature used by many newspapers, carries a column on "Roads of Remembrance," pointing to the opportunity to beautify the country and at the same time impress the need of a national forest policy. The *Washington Times* and the *Washington Herald* give generous space to the article and the *Washington Star* uses nearly a column in telling of the Association's suggestion for tree planting along the drive to connect two of Washington's famous parks. Dr. Frank Crane, in his daily editorial, used by about

one hundred of the biggest newspapers, indorses the Association's Memorial Tree campaign.

In an editorial, "Trees as Memorials," the *Boston Post* says: "The sentiment is one which appeals directly and strongly to the heart of our people. The American Forestry Association is aiding the governments of Great Britain, France and Belgium in their schemes for repairing the forest devastation wrought by the Hun and compelled by their own military needs. To restore and beautify the world for which our boys fought and sacrificed so bravely is their best and most enduring monument." The *London Mail*, speaking of the ravaged forests, says: "England in one regard looks strangely like those parts of Belgium where the Germans have resided. You see wherever you go acres of sawdust chips in place of vanished forests." The *Mail* then goes on to give the plans of Mr. Acland, of the Woods and Forest Department. Under the heading "Trees for France," the *Goshen, Indiana, Democrat* says: "It is a practical suggestion.

America can send almost any desired variety of tree or shrub." The *Indianapolis Star* points to "a recent survey of the forests in France by the secretary of the American Forestry Association," and adds that "the situation presents a tremendous problem not only for the nations involved but for other countries as well." "America's natural resources have been the salvation of Europe,"

is the way the *Boston Globe* puts it, while the *Buffalo Evening News* quotes the figures from the American Forestry Magazine to show the need of increased planting. The *Baltimore Sun*, *Minneapolis Journal*, *New York Times* and many other papers quote the magazine for a column on the destruction of the forests in the battle areas. The *Dayton Herald* quotes the Association's "Don't's" for forest fires and points to the need of a national forest policy, saying, "Only the United States lags." The *San Francisco Examiner* uses an eight column box across the top of the first page on a telegram of congratulation to San Francisco upon the dedication of its Hero Grove. These are but examples of the way the editors of the country are co-operating in the drive for a national forest policy.

CALL TO MEMBERS

Enlist for service with **YOUR ASSOCIATION**. The need of a national forest policy will be doubly impressed upon the editor of your paper if you point out this need to him. Write a short statement of facts, sign your name as a "member of American Forestry Association," and send the copy to the editor of your newspaper.

Discuss local park and tree situations with the editor for he wants to know the public opinion and values it highly. Where trees need attention tell him and you will find ready response, for the editors of the country are keen to help.

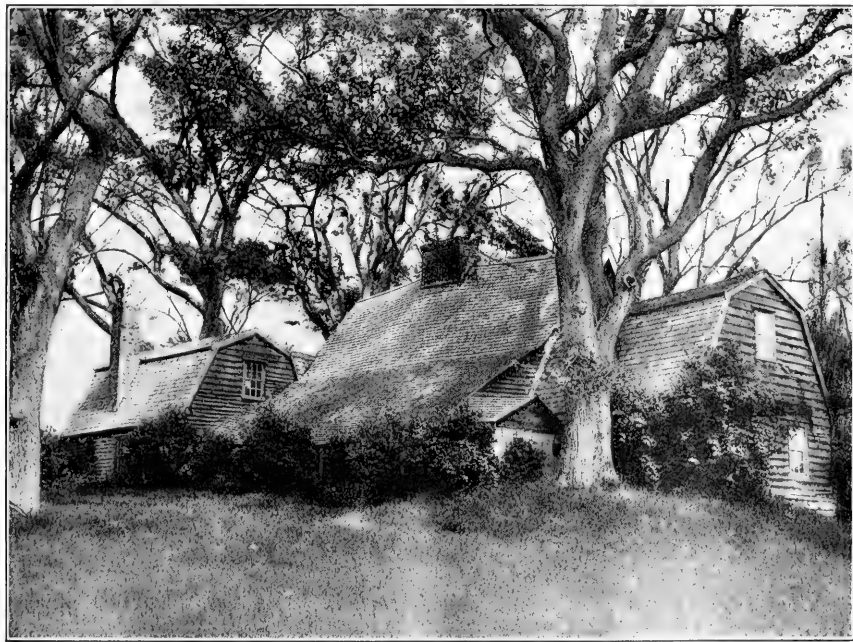
FORESTRY—THE RELATION OF WOOD TO THE DEVELOPMENT OF CIVILIZATION

BY WILLIAM CARSON

WE HEAR much and read much of the Coal Age, the Iron Age, the Age of Steel—and their influence on civilization. In our own time we have been impressed with the amazing changes brought about by iron and steel. We traverse continents on rails of steel; span broad rivers with bridges of iron and steel; ply the seven seas in ships of steel, and soar through the air in machines with steel frames. With steel tools and machines the luxuries of yesterday are brought in reach

tributed to all the ages. And though its functions have been in the quieter walks of life, less glorious and spectacular than iron and steel, its contribution to man in his struggle onward and upward has been no less bountiful.

Even before the dawn of history, man was dependent on it for his existence; and on every frontier down to our own day it has been one of man's chief reliances. It has been more than an influence; it has been essen-



Courtesy of The White Pine Bureau

THE "OLD FAIRBANKS HOUSE" AT DEDHAM, MASSACHUSETTS

The oldest house in America now standing in practically its original condition, again with the possible exception of the shell and adobe houses of Florida and California, is the "Old Fairbanks House," at Dedham, Massachusetts, the central section of which was built in 1638. The picturesqueness of this old, weather-beaten house, nestling beneath a wealth of overhanging elms and breathing the sweetness and charm of old New England, has an appeal unequalled by any other of the early Colonial houses. Although its unpainted white pine siding has stood exposed to the severe New England climate for almost three centuries, it is still almost perfectly preserved—a testimonial to the lasting qualities of wood.

of all, adding immensely to the comforts and enjoyment of life; and with other steel tools we fashion guns that hurl masses of steel twenty miles through the air and kill myriads of men. Truly the influence of iron and steel has been stupendous—stupendous beyond our conception.

Yet, though iron and steel are mere tyros as compared to wood, no period has been designated the Wood Age. No particular period could be. Wood has con-

tial—indispensable. Man first took refuge in the tree and with its branches built his fire to cook his simple meal. With his wooden club he went forth to provide food for himself and his family. He lightened his first journeys with a staff of wood, and as he became more venturesome floated down the water-courses on a log. When love of home conquered his roving disposition he scratched the ground with a stick and sowed his seeds, and in time made his first plow of wood. As the cen-

turies wore away and the great migrations came, wood was once more destined to play a leading role. On wooden wheels and in wooden boats man went forth to the ends of the earth—from Asia westward to Europe—and from Europe across the Atlantic to the New World.

As man pushed forward the frontier of civilization, commerce grew. We marvel at the millions of tons of freight transported annually on steel rails and steel ships; but centuries must pass before steel's tonnage can equal the traffic that has gone up and down the highways of the earth in wooden ships and on wooden wheels.

But wood has done more than provide man with his necessities and comforts. His earliest efforts in sculpture and carving were formed from wood. There stands today in the Gizeh Museum in Egypt a wooden statue, the oldest record of man's achievement in sculpture. If Moses saw it, he must have looked upon it in wonder, for it was 2000 years old before he was born. We think of wood as something perishable, as something that soon decays; yet here is a wooden statue, 6,000 years old—older than any stone or marble statue in existence. In passing it may not be amiss to remark that the oldest living things on earth are the giant Sequoia trees of California.

And in music—from the first hammerings on a wooden tom-tom to the symphony orchestra—wood instruments have thrilled man in all ages. No instrument of brass can produce the range and variety of tones or approach the human appeal of the wooden violin. The metal strings of the piano get their tone and quality from the white pine sounding-board.

Sometimes, too, I surmise that wood has been rather lavishly used in making the heads of some of our statesmen.

In this land of ours, wood—and especially white pine—has been a powerful influence in shaping her destiny. When the colonists came to New England and New York they found an abundance of white pine distributed over the country. The ease with which it could be worked made it readily accessible for sheltering the settlers and their stock. And later it gave expression to their culture and love for the beautiful in those stately houses and those dignified churches which still stand as sound as when they were built and give inspiration for so many of the beautiful architectural designs of today.

The history of the early Colonies repeated itself in the upbuilding of the great Middle West. The pioneers who came to the Mississippi Valley settled along the rivers and creeks where there was timber available or where it could be transported by water. The necessity for wood, with which to build their homes and barns, and for fuel, kept them from the more fertile prairies ready for the plow that lay back from the streams. As the settlers became more numerous the great white pine forests bordering the Great Lakes and the Mississippi, Chippewa and St. Croix Rivers were tapped, and they have ever since been serving the needs of the country. Fortunate indeed were the settlers to have such an abund-

ant supply of wood that was light, easily transported, easy to work, durable and good for practically all uses to which a soft wood can be put.

It is impossible to conceive the development of the Middle West without the white pine forests of Michigan, Wisconsin and Minnesota. Certain it is that the fertile plains of this great granary must have lain unproductive many years longer had not such an adaptable building material been so close at hand. And think what it means today that this vast region is producing food for us and for our Allies. The products from "the bread-basket of the world"—from the country of white pine houses and white pine granaries—may save civilization from the deadliest attack ever aimed at its progress.

And in this world crisis we of America and our Allies once more turned to wooden ships to save the day—to keep the supply of food unbroken for those who fought with us that democracy might rule the world and that all peoples might live together in peace and justice. Wood has been a powerful factor in the upbuilding of civilization—and we in our day have seen it one of the deciding factors in saving that which it has through the countless ages so laboriously helped to build.—(*White Pine Monograph.*)

USE OF CUT-OVER LANDS

A PRELIMINARY study of cut-over timberlands in the south, with a view to determining their best utilization, is being planned by Dr. H. C. Taylor, chief of the new Bureau of Farm Management of the Agricultural Department, and Dr. L. C. Gray, head of the new Division of Land Economics in that Bureau. Cooperation in this work is expected from State authorities, especially those connected with state agricultural colleges and experiment stations, and also from the various organizations interested in the development of the south.

The work this year will be limited by the appropriations made by Congress for the Bureau of Farm Management, which are not as large as requested by Secretary Houston.

In considering the problem of utilizing southern cut-over lands to the best advantage, it is planned to first mobilize data already in the possession of various branches of the government that bear upon the subject. If funds admit this will be followed up next year with a more extended investigation in a number of localities in the southern states. These investigations should include an intensive study of certain questions related to the colonization and development of cut-over lands and this should result in assembling a mass of detailed data that will be of great use in bringing about agricultural development in the southern states, particularly the coastal plain area extending from Virginia to Texas, in which is situated the bulk of the pine stump lands.

R. B. MILLER has been appointed State Forester of Illinois and assumed his new duties on July 1. The state forestry work is under the direction of the State Natural History Survey Division and is located at Urbana.

STATE NEWS

MINNESOTA

THE Minnesota Forest Service is just closing a deal with the Pine Tree Lumber Company for the purchase of approximately 6,000,000 feet of virgin pine timber within the boundary of Itasca State Park, the consideration, \$13.00 per thousand for white and Norway pine, \$9.00 for spruce and \$5.00 for jack pine; the land, about two thousand acres, together with the miscellaneous timber will constitute a gift to the State. It is valued at \$25,000 to \$30,000. One of the groves on this land, a magnificent stand of Norway and white pine, has been named the "Theodore Roosevelt Grove."

Itasca State Park and Forest was well provided for by the 1919 Legislature. As a result, the summer hotel property at Douglas Lodge has been greatly improved, a number of new buildings are being erected, including a large restaurant, to be known as the "Forest Inn." An electric light plant has been installed, thus reducing a considerable element of fire danger, fourteen sections of land on the west side of the forest will be bought, the necessary money being provided for the purpose. The State Forester has just arranged for the grazing of one bunch of sheep, twenty-two hundred head, along the west edge of Itasca Park and Forest. The Forester has contended for some time that the grazing of sheep in this kind of country, where there is so much grass, weeds and brush, would afford the best kind of fire protection. It is believed also that little, if any, harm would be done in the woods, since stock will not eat the little coniferous trees so long as there is an abundance of other forage. There was some question as to the advisability of permitting sheep grazing because of the possible effect on game range, but the location of the grazing area with respect to the feeding grounds of the deer safeguards this feature. Also, on account of the late entrance of the sheep, there will be no danger of their trampling the nests of ground-nesting birds. There is another feature worth watching in this connection. It has been difficult to obtain natural reproduction of pine in portions of Itasca Park owing to the dense growth of brush and small vegetation. There is a probability that sheep grazing will bring about more favorable conditions for pine reproduction through a partial removal of the brush and trampling of the soil to prepare it for the seed.

If this experiment works out satisfactorily, it will be the beginning of a great industry in that part of the State because there is range for several millions of sheep during the summer months. Sheep might

be brought from Montana and other Rocky Mountain States about the first of July, fattened on the abundant forage in the timber country of northern Minnesota and then sent to the stock yards of South St. Paul and Chicago. The Forester is convinced that the forest fire danger in Minnesota will be greatly reduced with the increase of stock grazing in the wooded districts. Fires in the woods do not run readily and are easily controlled wherever the grass, weeds and under brush has been even moderately eaten down by stock.

MARYLAND

WITH special war activities practically concluded, the Maryland State Board of Forestry has well under way numerous new projects of prime importance to forest owners and timber users of that State. The summer's field work has been arranged to develop various brand—new and useful activities, and to push to completion projects already undertaken.

An intensive study of willow culture, with new opportunities opened by the war, will shortly be finished and published. Volume tables have been or are being prepared for every commercial tree species in Maryland. Thousands of taper measurements of hardwood and softwood trees have been secured in sections of the State where these varieties reach commercial importance. Sets of curves are built on these at headquarters, and in the very near future Maryland will have its own volume tables to use and enjoy. These will be published, and made available to all requiring accurate, and localized, information in measuring, buying and selling forest products. They will not only include, as usual, lumber and cordwood, but will be made applicable also to all forest products for which each tree is fitted and used, in board feet or cubic contents. State co-operation is being extended forest owners in the practical improvement of their timbered holdings, foresters from the Board directing marking and estimating, and if necessary supervising cutting, on tracts from a few to several hundred acres in size. This work is well received, since it secures the owner reproduction of the best, removal of the poorest, and sale of material for what it is worth. In connection with and in extension of this, experiments in cheap and effective tree-killing are under way, methods employed, both old and new, being by mechanical and chemical means. Proper treatment of public trees is still assured through application of Maryland's Roadside Tree Law, and active supervision of all operations by the Board.

Profiteering landlords who charge too

much for summer cottages have been hit a body blow by free camp sites on Forest Reserves. The State's five Forest Reserves are open with few and easy restrictions to those feeling the summertime call of the wild. Camp sites have been selected, marked, and made ready by the State. Getting your "pick" is free of red tape; all the camper has to do is sign an application, send it in, and pitch his tent.

In co-operation with various private companies and progressive individuals, experiments in Loblolly pine reproduction on the Eastern Shore are being carried out. Information desired is on the best methods of securing N. S. R. in Loblolly. Sample plots are carefully laid out, and results will be watched until conclusive.

Ten years ago Maryland's wood-using industries were the subject of research and report. Recently, knowing these results to be old and the data no longer authentic, the Board took up a canvass of the subject. Much interest was manifested by the various industries approached, and practically 100 per cent co-operation gained in the preparation of a new and complete report, well illustrated, on "The Wood-Using Industries of Maryland." It is now in the hands of the printer, and will be issued shortly. Both study and subsequent report represent, exclusively, State work.

NEW JERSEY

FOR several years State Forester Alfred Gaskill has been urging owners of woodland to give their timber a little care and attention, in order that its value and productiveness might be increased. It has been the practice in this State and elsewhere to cut off the woods without care or thought of the future, and then allow Nature to do the best she can in replacing the abused timber growth. The following results of a "thinning" experiment in the so-called "scrub oaks" of Burlington County prove that such attention is profitable.

A portion of the Lebanon State Forest was selected for the demonstration. The tract consisted of a rather dense stand of young oaks from ten to twenty feet tall, growing on sandy soil of low fertility.

Two similar plots of approximately one acre each were laid out, and the trees on each counted and measured. Then plot No. 1 was "thinned" to relieve its overcrowded condition. Enough crowded, weakened and suppressed trees of the poorest species were removed to give the remaining trees the proper amount of light and growing space for their best develop-

125 MILLION FEET NATIONAL FOREST TIMBER FOR SALE

Location and Amount.—All the merchantable dead timber standing and down, and all the live timber marked or designated for cutting on an area of about 6,000 acres of Government land in T. 44 N., R. 4 E.; T. 44 N., R. 5 E., and T. 43 N., R. 5 E., within the watershed of Fishhook Creek, St. Joe National Forest, Idaho, estimated to be 33,000 M. B. M. green white pine; 9,000 M. B. M. dead white pine; 30,000 M. B. M. Engelmann spruce; 13,000 M. B. M. cedar; 12,000 M. B. M. white fir and hemlock; 10,000 M. B. M. larch and Douglas fir; 5,000 M. B. M. lodgepole pine, balsam fir and yellow pine saw timber, 60,000 cedar poles, more or less; and an unestimated amount of cedar posts, piling and shingle bolts. About 4,000 acres of privately owned timber in the same watershed is also available for purchase from the Northern Pacific Railway Company.

Stumpage Prices.—Lowest bid considered \$2.50 per M for green white pine; \$1.00 per M for spruce and yellow pine; 50 cents per M for all other species and dead white pine; and special rates for cedar products of various dimensions.

Prices will be readjusted at the end of the third, sixth, ninth and twelfth years.

Period for Removal.—A period of fifteen years will be allowed for the removal of the timber, with two additional years within which to construct initial improvements.

Deposit.—With bid, \$10,000.00 to apply on purchase price if bid is accepted, or refunded if rejected. Ten per cent may be retained as forfeit if the contract and bond are not executed within the required time.

Final Date for Bids.—Sealed bids will be received by the District Forester, Missoula, Montana, up to and including September 23, 1919. The right to reject any and all bids is reserved. Before bids are submitted, full information concerning the character of the timber, conditions of sale, deposits and the submission of bids should be obtained from the District Forester, Missoula, Montana, or the Forest Supervisor, St. Maries, Idaho.

ment. Plot No. 2 to serve as a check or control, was not thinned.

Seven years later, in June, 1919, neither tract having had any attention except protection from fire, the plots were again measured and the following results were noted: Plot No. 1 (thinned plot) had 380 living trees, the volume of which was 10.03 cords per acre, or an increase of 5.57 cords, not counting the one cord removed by thinning. Plot No. 2 contained 558 living trees, with a total volume of 8.63 cords, or an increase of less than a cord (.91 cords) for seven years' growth. In other words the thinned plot almost doubled its wood volume in seven years, while the adjoining unthinned plot in the same time increased less than nine per cent. Forestry pays! The State Forester is ready to help anyone interested in such a project.

KENTUCKY

J. E. BARTON, Commissioner of Geology and Forestry, announces at this time that the Kentenia-Catron Corporation will transfer to the State of Kentucky for use as a State Forest Reservation approximately 3,400 acres of land on Pine Mountain in Harlan County. The gift of this land to the State is in fee simple, subject only to existing contracts for the removal of certain timber on the area. The gift is made through Mr. Charles H. Davis, the President of the Company, and Mr. W. W. Duffield, Agent of the Company for Kentucky. The gift of this land to the State for purposes of a state forest is the biggest stimulus to the management of timber tracts under effective forestry principles that the movement in the State to this end has yet seen. The Kentenia-Catron Corporation has always had a keen interest in the forestry problems of the State and the concrete way which they have now taken to show this interest is worthy of their efforts heretofore in the same direction. The area has a mixed stand of hardwoods, common to the region, and includes some pines. The management of this tract on scientific forestry principles will serve as an excellent example of what can be accomplished under these conditions in the Southern Appalachian region. Active steps will be taken to put the area under effective administration at an early date. Immediate measures will be taken looking to the protection of the timber on the tract from fire and other destructive agencies.

ILLINOIS

THE Quincy, Illinois, High School has a forestry club, the purpose of which is to save the trees we have now and to plant others. A Science Club, of the same city, composed of twelve or fifteen enthusiastic nature students, has secured a small tract of land and is growing on it such forest trees as pecan, persimmon, walnut and chestnut, which are to be trans-

planted to suitable locations as the club members take their weekly hikes.

The University of Illinois has an experimental forest tree plantation begun in the spring of 1871 from which some interesting data should now be secured. An appropriation of \$1,000 was made in 1869 by the Legislature for trees and seeds. Thirteen acres were planted on prairie soil under the direction of Prof. T. J. Burrill, horticulturist and botanist, and G. W. McCluer, M. S., assistant horticulturist. It is located at the experimental farm, on Lincoln Avenue. Forest records were kept for 1871, 1872, 1876 and 1886 by Professor Burrill, in which are stated the amounts expended for plants, planting, cultivation, etc., and the receipts from thinnings. European larch, elms, spruce, white pine, soft maple, basswood, black walnut, Bur oak, red oak and hickory are the species which have done best. The forest is fenced and is used to some extent by the residents of Urbana as a park.

GEORGIA

EXTENSION Forester Zimm devoted the month of July to the Extension Schools, which are held in connection with the District Agricultural Schools. One phase of the work which Mr. Zimm is emphasizing is the preservative treatment of fence posts, shingles, and other farm timbers, and he has succeeded in establishing a small treating plant for demonstration purposes at each District School.

Vocational work in forestry and agriculture is receiving considerable attention at the Georgia State College of Agriculture. Approximately 150 rehabilitated soldiers have been sent to the College for special work and the Vocational Board states that preparation should be made to accommodate a total of between four and five hundred.

In connection with the program for Highway Construction and Improvement, to be conducted co-operatively by the State and the Federal Government, the Georgia State Highway Commission has recommended that the establishment of roadside trees be given consideration at the same time. The Georgia State Forest School, through the Extension Forester, has agreed to co-operate with the Highway Commission in this phase of road improvement.

A bill introduced in the Georgia General Assembly provides for the placing of all forestry matters in the hands of the Board of Trustees of the Georgia State College of Agriculture and empowering the Board to appoint a State Forester. The bill is the result of a conference of interested persons of the State and Mr. Peters, of the U. S. Forest Service. It is believed that the passage of this bill will enable the State to give proper attention to this most important of all natural resources—the forest. The bill has the enthusiastic support of the lumbermen of the State.

Creosoted Water Tanks— Home-Made—

The species and condition of wood specified for the creosoted water tank, shown below, permit employment of the Open Tank Process either at the shops of consumers or at the mills.

Loblolly pine is available at many isolated mills, which because of their location cannot economically supply lumber treated by pressure process. However, they could equip themselves to creosote by the Open Tank Process—*providing they will meet the necessary requirements of seasoning and framing.*

Lumber and timber, as specified, can be purchased from many sources by consumers, manufactured as required and creosoted by the Open Tank Process with Carbosota Creosote Oil, either at the *building site* or *shops*. The treating tanks, etc., required for creosoting can be made portable or stationary.

The Open Tank Process is *not* recommended as a substitute for the empty-cell pressure processes, where the latter is practical, but as a means of creosoting and

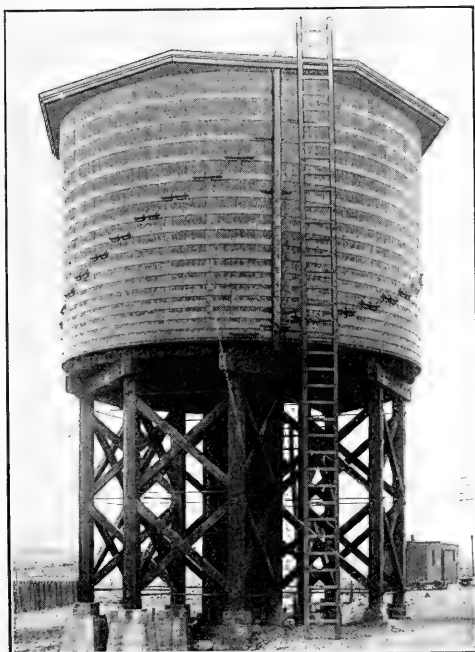


making this grade of lumber available for the purpose, under conditions where the empty-cell pressure process cannot be employed.

The Open Tank Process is efficient and comparatively economical, but requires a refined, coal-tar creosote oil. That means Carbosota Creosote Oil which conforms to U. S. Railroad Administration Specification R-828-A.

Carbosota is merely a trade-mark which guarantees an absolutely uniform, highly refined, pure, coal-tar creosote oil, physically fit for non-pressure treatments, and chemically of the highest preservative value.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)



Knowles Type Creosoted Water Tank erected at Mattoon, Ill., by the Illinois Central R.R. (Creosoted by Empty-Cell-Rueping Process 5 lbs. A.R.E.A. No. 1 Coal-Tar Creosote Oil per cubic foot.)

THE salient features of this type of tank, and the several factors that warrant recommending the Open Tank Process, are quoted from an address by C. R. Knowles, Supt. of Water Service, Illinois Central Railroad, published by the Southern Pine Association, in a pamphlet entitled "Southern Pine Tanks."

"The timber used in Loblolly Pine, coming under the general specifications for tank timber except that no restrictions are made as to heart or sap. The timber is air seasoned, and should be permitted to season for three months in favorable weather."

"A very important feature in the construction of these tanks is that all timber more than 1 inch in thickness is framed before treatment to secure the maximum life from the treated timber. The work of framing the tank before treatment, is given such careful attention that it is rarely necessary to bore a hole in the treated timber during the field erection of the tank."

"In water tanks, however, there is always an intermediate condition of moisture in which the wood is dry on the outside and wet on the inside, thus promoting rapid decay."

"It is difficult to point out any portion of the tank more susceptible to decay than another, although decay in the tops of the staves is more noticeable, and the timber probably decays more quickly here than in any other part of the tank."

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SALE OF TIMBER, KLAMATH INDIAN RESERVATION.

CLIFF BOUNDARY UNIT.

SEALED BIDS, MARKED OUTSIDE "BID, Cliff Boundary Timber Unit" and addressed to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon, will be received until 12 o'clock noon, Pacific time, Tuesday, September 23, 1919, for the purchase of timber upon about 10,000 acres within Townships 33 and 34 South, Ranges 7 and 8 East of the Willamette Meridian. The sale embraces approximately 100,000,000 feet of yellow pine and sugar pine. Each bid must state for each species the amount per 1,000 feet Scribner decimal C log scale that will be paid for all timber cut prior to April 1, 1921. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three-year periods. No bid of less than three dollars and seventy-five cents (\$3.75) per 1,000 feet for yellow and sugar pine and one dollar (\$1.00) per 1,000 feet for other species of timber during the first period will be considered. Each bid must be submitted in duplicate and be accompanied by a certified check on a solvent national bank in favor of the Superintendent of the Klamath Indian School in the amount of \$10,000. The deposit will be returned if the bid is rejected but retained if the bid is accepted and the required contract and bond are not executed and presented for approval within sixty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information application should be made to the Indian Superintendent, Klamath Agency, Oregon.
Washington, D. C., July 11, 1919 CATO
SELLS, Commissioner of Indian Affairs

PLANT MEMORIAL TREES FOR OUR HEROIC DEAD

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

AT the summer meeting of the Woodlands Section of the Canadian Pulp and Paper Association, mentioned in our last number, a discussion of vital importance to the forests took place. The work of fire prevention for the past seven years has shown conclusively that cut-over areas are the most liable to have fires started in them, and once started these fires are the most difficult to extinguish and do the greatest amount of damage. A few years ago when the areas cut over each year were comparatively small and often widely separated, a fire in a lumbered area only destroyed a small section, but now that the yearly cut has so increased, over two hundred per cent, and whole river valleys now are practically cut-over the situation is becoming very serious and some steps must be taken to dispose of the debris from logging. It is the general opinion of foresters and many lumbermen that the present method of cutting to a diameter limit is unwise, unscientific and wasteful. The coniferous trees, being shallow-rooted blow down, the remaining hardwoods soon form a dense cover and prevent the growth of the conifers and those trees which are left under the supposition that they will form a future crop, if they do not blow down, make practically no growth as they were, for the most part, suppressed. It has also been shown that where clean cutting of conifers and most of the hardwoods is practiced, a dense growth of spruce and balsam appears at once. The proper method to be adopted should be that of clean cutting of both conifers and hardwoods, brush burning and then management of the stand. By management is meant the proper thinning of the natural regeneration and the removal from time to time of the undesirable species. The time has certainly come when we should realize that to get the most out of the forest we must handle it according to the proper principals. Forest farming has its rules just as agriculture has and they must be followed and must be applied by men who know them and who have the necessary technical training. We can no longer continue to treat our forests as mines and use up our forest capital. Methods of cutting must be revised, slash must be disposed of and systems of management put into practice if we are to have forests in the future.

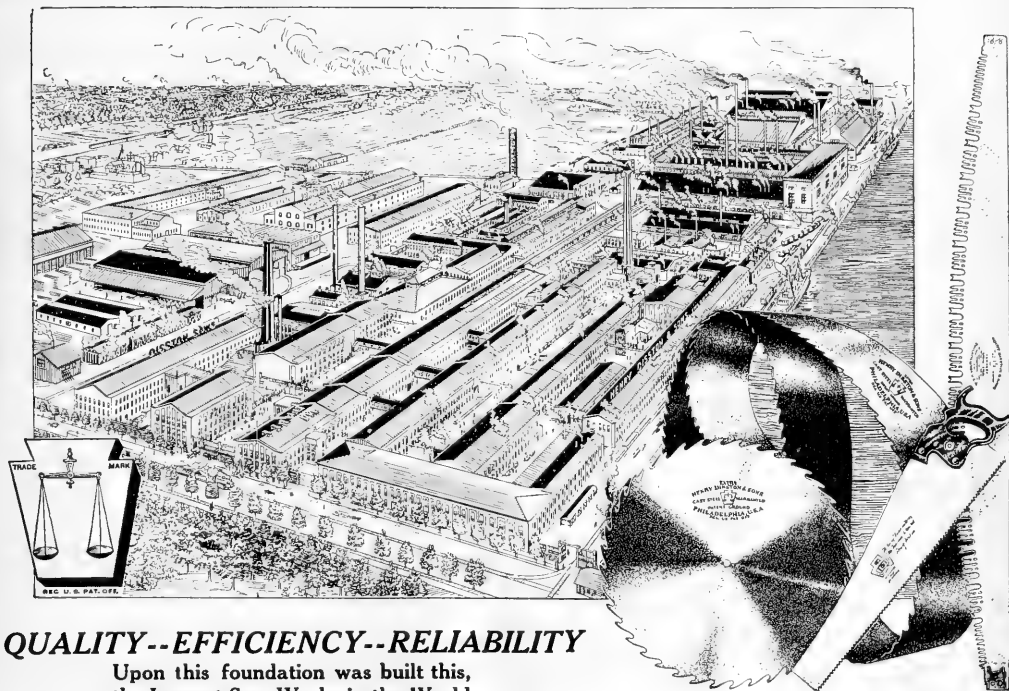
Clyde Leavitt, Forester to the Commission of Conservation and the Dominion Railway Board, was operated on in Ottawa,

June 25, and at last reports was doing very well.

Mr. F. W. Reed represented the U. S. Forest Service at the meeting of the Woodlands Section and took part in the discussion. Mr. Sterling, of James D. Lacey and Company, and Mr. R. S. Kellogg, of the News Print Service Bureau, were also present. Mr. Craig, of the Commission of Conservation; Mr. G. C. Piche, Chief Forester of Quebec; Mr. Prince, Chief Forester of New Brunswick; Mr. R. H. Campbell, Director of Dominion Forestry Branch; Mr. Avery, of the Spanish River Pulp and Paper Company; Messrs. Yberg and Jewett, of the Riordon Pulp and Paper Company; Mr. Galarneau and Mr. Nix, of the St. Maurice Paper Company; Mr. Cressman, of the Wayagamack Pulp and Paper Company; Mr. Sweezy, of the Royal Securities Company; Mr. Kiffer, of the Quebec Forest Service; Captain Tremblay, of the Donnacona Paper Company; Mr. Schanche, of the Abitibi Power and Pulp Company, and Messrs. Arnold Hannsen and R. W. Lyons, of the Laurentide Company, were among the Canadian foresters present.

The new classification of the Canadian Civil Service has just been published and the salaries for foresters are so low that no man who has taken four years at college and a technical two years' course thereafter can afford to work for the Dominion Government. Foresters have been rated lower than any other professional men. The result will be that the service will soon lose all its good men. Salaries in many cases are far below those that the present incumbents are receiving and in one case a position has been reclassified and will hereafter receive less than its present holder received on commencing nearly ten years ago. The schedule is as follows:

Some comparisons are of interest. The Dominion Entomologist is to receive \$3,900 to \$4,800; the Dominion Foresters, \$3,600 to \$4,500. A geologist is to receive \$3,300 and UP; a forester, \$1,680 to \$2,100. The Director of the Forest Products Laboratory is to receive only \$3,120 to \$3,600. In most cases Provincial Governments are paying better salaries, as do also private concerns. Practically the whole of technical staff of the Forest Products Laboratory has been engaged by private concerns. As inevitably the management of Government Forests must come into the hands of technical men, and as they constitute such a



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Keystone Saw, Tool, Steel and File Works

HENRY DISSTON & SONS,

PHILADELPHIA, U. S. A.

HELP TO REFOREST FRANCE

THE AMERICAN FORESTRY ASSOCIATION has undertaken the great task of helping to reforest the shell-torn, war-shattered areas of France; and to aid also Great Britain, half of whose forests were felled; Belgium, whose forests suffered terribly, and Italy.

The great humanitarian need, the prime economic importance, the broad constructive value of this work—all place it on a plane which gives it striking pre-eminence. Therefore, it is felt that every member of the American Forestry Association will desire to have a part, and as big a part as possible, in carrying out this program.

BY those who are competent to judge, it is asserted that the forests of France kept the Germans from Paris. How great a debt, then, does the world owe to them!

AMERICA can build no nobler memorial in Europe than by replacing the devastated forests of France, Great Britain, Belgium and Italy. Answer this appeal at once by sending your check for whatever amount you can afford, to the American Forestry Association. It will help to purchase the seed needed to replant the forests of our Allies.

Checks Should Be Sent to

THE AMERICAN FORESTRY ASSOCIATION

WASHINGTON, D. C.

Evergreens for All Year Beauty

Screens—Hedges—Windbreaks



Many places lose their beauty when the leaves fall in Autumn. There is nothing in the landscape to sustain interest.

Other places remain attractive and cheerful looking. They have plenty of color. The cold winds are tempered. There is as much fascination in rambling about the grounds in winter as in summer.

EVERGREENS make the difference when nature has wrought her worst havoc with snow and sleet, their beauty is only intensified as they bend fantastically under their icy load and glisten with crystal drapery.

Plant In August or September if you are ready, or later if necessary. Whenever you plant and whatever you plant, it is guaranteed—**IF YOU GET IT FROM HICKS**. Get our special prices now on several thousand evergreens 2 1/2 ft. high. We must clear from leased land. Very highest quality in root and top.

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Our illustrated and descriptive catalogue of Orchids may be had on application. Also special list of freshly imported unestablished Orchids

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Write for prices on large quantities

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HOW TO PRUNE YOUR TREES

Always use a pole saw and pole shears on the tips of the long branches.

Do not "head back" or cut off the top of a tree except where the tree is old and failing, and then under special instructions.

Be as sparing and as judicious in pruning as possible, and do not raise the branches so high as to make the tree look like a telegraph pole.

Commence pruning the tree from the top and finish at the bottom.

Make every cut as close and parallel to the trunk as possible.

To make the cut perfectly smooth the saw must be well set and sharp.

Leave no stubs, dead and dying wood, or fungus-covered branches behind you.

Do not fail to cover every wound with coal tar, not allowing it needlessly to run down the trunk.

Do not remove several large branches on one tree at a time. They must be removed gradually, the work extending over several seasons.

large share of the natural wealth of the country the effect of putting such responsibilities on the shoulders of second-rate men will be disastrous.

The patrol flights of the seaplanes of the St. Maurice Forest Protective Association have commenced and are proving practical. It is easily possible to locate forest fires at forty to fifty miles and if they are not too far from a lake or a river the plane crew can detect and extinguish them. A forester who made a flight recently reports

that the various timber types can easily be distinguished and that photographs taken from the air will make most satisfactory maps.

Forest fires of large size are reported in the Cochrane and Cobalt districts and some cut pulpwood is reported destroyed.

The *Aftenposten*, a daily newspaper published in Christiania, Norway, has an article on Silviculture and Social Conditions in Canada, which refers to the work of the Laurentide Company and gives photographs of its nursery and reclamation work. It says that labor conditions in Canada are better than those in Norway and that Canada is getting ahead of Norway in forestry matters. The article was written by Mr. W. Rolsted, who is in charge of the Royal Forests.

The Province of New Brunswick has issued a circular letter appealing to school teachers and pupils to co-operate in preventing forest fires and to try and tell people how they can aid this great work. It explains how to build and extinguish a camp fire, how to notify a fire ranger in case a fire is discovered, and describes the uses and necessity for keeping our forests.

In forestry, as in every other movement for better conditions education is the most important thing. Legislation, especially if repressive, arouses antagonism, and often defeats its aim. Education of all, from the child to the adult, brings the best and quickest results. The writer is reminded in this connection of an incident which he witnessed while living in Switzerland. A bill was brought before the legislature for compulsory old age insurance. A few months before the bill was to be voted on the government sent around to every city, village and hamlet, lecturers who discussed both sides of the question impartially, giving figures of the cost of such a scheme, the results attained in other countries and all possible information. When the time came for the vote, the people knew just what they were doing and had thoroughly discussed the thing among themselves. It has been said that for twenty years forestry propaganda has been carried on in the United States and is still without appreciable result. The trouble has been that the propaganda has not reached the people and has not been sufficiently intensive. It has been too technical and has not aimed at one reform at a time. It has tried to cover the whole field. People who have always been interested in the forest are reached but the great mass of the people see the question still as one of more or less academic interest only. It must be brought home to them more directly.

DAVEY TREE SURGEONS



Estate of Mrs. A. M. Booth, Great Neck, Long Island, New York.



W. G. Woodger, Garden Superintendent, Mrs. A. M. Booth Estate

The tribute of W. G. Woodger to Davey Tree Surgery

Broad Lawns, Great Neck, Long Island, New York.

The Davey Tree Expert Co., Inc., Kent, Ohio.

Gentlemen: I felt it my duty to write you a few lines in praise of the work of your representative and men on several fine trees on the estate of Mrs. A. M. Booth, most especially the very fine work done on a grand willow tree, not quite two years ago.

My employer is most gratified with the work and thinks there is no equal to The Davey Tree Expert Company. The men are extremely keen on their work and know it thoroughly. I am very interested in their work and think them worthy of great praise.

Yours truly,

W. G. WOODGER,

Garden Superintendent.

The saving of priceless trees is a matter of first importance on every estate. Davey Tree Surgery is a fulfillment of the maximum expectations of those who love and value trees. A careful examination of your trees will be made by appointment.

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Loss of this magnificent willow would have been irreparable. Note how Davey methods have bound the branches together with rigid steel rods, and filled the cavities sectionally with concrete to allow for the swaying of the tree



VENTED BY CONTROL OF SURFACE FIRES

(Continued from Page 1264)

from five to fifty years, the periodical rotation depending upon the local rate of litter accumulation. The litter is then too wet to cause crown or ground fires.

2. Do not light fires in the forest litter after the humus becomes dry. A wet humus serves as an index to the safe firing season and prevents ground fires.

3. Do not light fires while a high wind is prevailing.

4. Burn the snags in mid-winter when the conditions are unfavorable for fires.

5. Fire the lodgments of litter while conditions are still unfavorable for surface fires.

6. Light the first fires over the areas of least litter and least density of stand.

7. Backfire from the barriers. These barriers may be roads, trails, canals, barren and cultivated areas, recently burned-over areas, bodies of water, ice and snow, and barriers scraped for the purpose.

8. Burn over the southerly slopes while the snow is on the north slopes.

9. Burn downward from the tops of the slopes.

10. Fire the ridges before the slopes and the slopes before the ravines.

11. In initiating fire control, the order of burning should be as follows for a five year rotation:

1st year—Standing dead trees.

2nd year—Ridges.

3rd year—South slopes.

4th year—North slopes.

5th year—Ravines.

These rules will often conflict and require a logical interpretation to fit the local conditions. No firing should be done without a thorough investigation of the litter conditions, topography, barriers, species and ages of trees and a study of the fire resistance of various species of trees. Standing dead snags, fallen trees, underbrush, limbs, cones, leaves, needles, weeds and any dead and inflammable material should be included as litter.

The importance of fire as a silvicultural agent in the coniferous forests has been recognized in that it has become the general practice to burn over cuttings to insure reproduction. The fires must be confined, of course, to moderate surface fires as would be possible if the foregoing rules are used. Fire is an aid to reproduction as it creates favorable conditions for the germination of the seeds, by removing competition, preparing the seed bed, opening the closed cones and releasing the seeds, temporarily driving away seed eating rodents, and removing insects and fungus. Fire serves to keep a forest clean and healthy by removing the insects and fungus diseases which have their origin in the rotting litter on the forest floor. The use of fire is a silvicultural method particularly adaptable to the coniferous forests because

of their great fire resistance and the fire favors the more valuable species and the high-limbing sports. A young conifer tree will withstand the intense heat which kills all but the topmost branches and the effect is similar to that in the pruning of a fruit tree—more vigor is put into the trunk and the new growth.

Our attempt to maintain the non-fire policy has shown that forest fires are inevitable where the forests contain a large proportion of inflammable litter. The destruction by fire increases as the litter increases. "Fire prevention," so called, simply delays the burning up of the last conifer tree where it stands.

The use and control of the surface fire is the solution of the fire problem in the coniferous forests.

PIGEONS WILL PROTECT FORESTS.

THE War, Navy and Interior Departments, according to information just received by the Manufacturers Aircraft Association, New York, are co-operating in the forest patrol. The idea of such a guard against timber fires occurred simultaneously to the Forest Service and to the air service of the Army. Now comes the Navy Department with the offer to establish pigeon lofts in the forest reserves and to provide the forest airplane patrol with carrier pigeons whose duty it would be to carry messages direct to home relief stations whenever a fire is discovered.

The pigeon branch of the Navy is expanding under the direction of Lieutenant McAtee, and recruits are now sought for this service, which is so closely akin to aviation that it is under the same general administration.

During the war there was no opportunity to train men for this important duty, but now a special school has been opened at Anacostia and twenty enlisted men are receiving daily instruction in the training and keeping of carrier pigeons. At the same time these men have opportunity to put their learning to practical uses.

The pigeon branch of the Navy has 2,500 birds. Plenty are available for the forest patrol. Experiments are going on constantly in the effort to increase the efficiency of the birds. Pigeons took an important part in naval warfare overseas. It has been proved that pigeons can fly at a speed at least equal to that of a sea plane or flying boat.

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BOOK REVIEWS

"The Book of the National Parks," by Robert Sterling Yard. Charles Scribner's Sons, New York. Price, \$3.00. The author of this book possesses all the attributes necessary to contribute to the success of such a work, being an official in the Department of the Interior and so thoroughly informed on his subject, as well as a writer of note and an enthusiastic lover of the out of doors. His book is a valuable contribution to the slowly growing literature on our national park system. It will fill a long-felt want, carrying, as it does, in interesting fashion, an account of the historical, scenic, geologic and recreational features of the parks; and treating in a popular way the geologic and other scientific features. It is well illustrated and has 15 maps and diagrams.

"Timber: Its Strength, Seasoning and Grading," by Harold S. Betts. McGraw-Hill Book Company, New York. Price, \$3.00. The preface states that this book is intended primarily for engineers, manufacturers and users of lumber and of various special classes of wood material, and students of engineering and forestry. Much technical information in readily accessible form is available regarding almost every phase of structural material with the exception of wood, and this book will in large measure supply this deficiency.



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POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of references. Address Box 600, care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, care American Forestry Magazine, Washington, D. C. (1-3)

WANTED: Young forester, preferably married, for clearing and maintaining woodland on small estate, operating private nursery, etc. Will pay \$80 or better, depending on qualifications and experience. Six room residence on state road included. Address Box 750, c/o American Forestry Magazine, Washington, D. C. (7-9-19)

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BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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practical and technical training in its short intensive course, to develop a well qualified forest workman. This is a co-educational undenominational institution with a total enrollment last year of 493 students. Its policy is to provide at a low cost a practical education for ambitious young people, particularly for the white youth of its own section of the country.

TABLE OF NATIVE MAINE WOODS

NINETEEN different kinds of native Maine woods are used to make a handsome and unique table for the Directors' and General Conference Room in the offices of the Eastern Forest Products Association at Bangor. The table is eight feet long and three feet wide with five legs. The top is made of six boards six inches wide, of the following woods; white ash, birdseye rock maple, black cherry, curly yellow birch, beech and quartered white oak.

The legs are of elm, hickory, chestnut, butternut and mahoganyed yellow birch. The ledge boards are of sycamore, white birch, brown ash and cherry birch. Under the margin of the top is a plate to give a thick top effect which is made of white pine, hemlock, white cedar and red spruce. With the exception of the mahoganyed leg, each piece is in natural finish and the effect is beautiful.

The table was the idea of H. G. Wood, Executive Secretary of the Association, and was made by Morse & Company, at Bangor, a member of the Association. The boards of birdseye maple and curly birch are exceptionally choice and are said by many to be the handsomest they have ever seen.

PLANT MEMORIAL TREES

FALL IS THE TIME TO PLANT NARCISSUS AND TULIP BULBS

TULIP bulbs should be planted in October, preferably about the middle of the month, and narcissus bulbs may be planted up to the middle of October, but preferably about the first of the month, according to specialists of the United States Department of Agriculture.

The bulbs should be planted in loose, rich soil, devoid of rank, or unrotted, or poorly incorporated manures. It should be dug to a depth of from 12 to 15 inches. The tulip bulbs should be set 5 inches apart and 4 inches deep and the narcissus bulbs about 10 inches apart and 5 inches deep.

If they are to be grown in pots or window boxes, light rich soil should be used. Place 1 to 2 inches of cinders or broken pots in the bottom of the pots or boxes to insure good drainage. After planting, place the pots or boxes out of doors and cover them with about 4 inches of ashes or sand; or they may be placed in a dark cool room or cellar for a few weeks, until the bulbs have formed a quantity of roots. They may then be brought into the light and heat for flowering. Keep the soil well moistened from time of planting, but avoid overmoistening, for if kept too wet the bulbs will decay.

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For further information address

Department of Forestry

Pennsylvania State College

State College, Pa.

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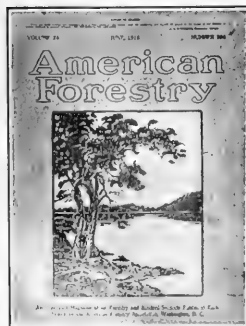
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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigation, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State, and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reform removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.



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GET TOGETHER

THE United States must decide upon a national forest policy in order to perpetuate its timber supply. We have no adequate forest policy now. We are far behind France, Great Britain, Germany, Japan and other nations in this respect."

THE United States has only about one-fourth of its original forest and this is now disappearing three times faster than it is being reproduced. We must, before it is all gone, provide for a timber supply for our future needs and we can do so if foresters get together with the lumbermen and timberland owners and agree upon a practical, workable forest policy. The country is grateful to Colonel Henry S. Graves, United States Forester, for demanding a national forest policy at this time, and the foresters are the men whom the country expects to formulate this forest policy. It is their business to do it and to do it well."

THE national and state governments hold only some three per cent of merchantable timber. Therefore, the majority of the owners of the timber must be in accord with any policy dictating the management, the protection, and the reforestation of their land before it can be successful. You cannot compel an owner to develop and perpetuate his timberland at a financial loss; if you wish him to reforest his land, you must make it pay him, as other countries do."

THE most important feature of a national forest policy on which agreement is possible is fire protection. Forest fires have this year caused millions of dollars of damage in the northwest. The United States Forest Service spent more than a million dollars fighting these fires in July alone. Private agencies spent lavishly in protecting their lands but the fire protection measures in neither national, state or private forests are sufficient to properly protect them. Get together then on a national, state and private forest fire protection program. It is the need of the hour and when this has been done the first step toward a mutually satisfactory national forest policy will have been made. Other features of this policy are certain to follow in due course."

CHARLES LATHROP PACK,
President, American Forestry Association.



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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

SEPTEMBER 1919 VOL. 25

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THE PINES

(An old legend)

BY LEW. R. SARETT

When the rolling waters covered the earth,
The mountains learned to love the waters.
When the whispering ocean rolled away,
The hills grew lonely for its music.
They prayed to the Spirit to send the sea back
To sing again to the mountains.
Then the Father planted the murmuring pines
At the foot of the hills, in the quiet valleys,
To sing of the sea in the winds of twilight;
To ripple and sigh in the breezes of evening.

AMERICAN FORESTRY

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NO. 309

FOREST LOSSES ON THE ITALIAN FRONT

BY NELSON COURTLANDT BROWN

U. S. TRADE COMMISSIONER

(Photographs by Courtesy of the Italian General Headquarters)

UNTIL October, 1917, the fighting along the Italian front had been restricted almost exclusively to the mountainous regions. The line, until that date, stretched from the mountains of the Carso region and the upper valley of the Isonzo along the Carnic and Julian Alps to Switzerland. The high divide along the crest of these mountains constitutes the natural boundary between Italy and Austria, and the small region about Trieste and the upper valley of the Trentino constitutes the "Italia Irredenta" for which Italy has largely been in the struggle. Before the unfortunate retreat from Caporetto the Italian front was longer than the entire Western front in France and Belgium, a fact which is generally not appreciated in this country. The total length formerly was about five hundred miles. For the year preceding the signing of the armistice, the length of the Italian front was about two hundred and twenty miles. Fighting in this rugged and precipitous Alpine country

was naturally carried on under the most extreme physical hardships. Correspondents who have been on all of the fronts have informed me that the tremendous physical difficulties encountered on the Italian front have far exceeded those of any of the other fronts and one can

easily understand this when seeing how the men live and fight and bring up their supplies under those most unusual conditions. The first impression one has is that it is difficult enough to merely exist in that precipitous Alpine region without attempting to maintain a fighting front and to bring up heavy guns and enormous quantities of supplies which fighting in that country involves.

For the last year of the war the Italian front ran partially across the

flat Venetian plain, the Piave River forming the boundary from the Adriatic Sea to Valdobbiadene, where it crossed the Piave River and rose sharply from the flat plain to the higher altitudes of the Alps. There is a most abrupt change from steep mountain topography to the flat plains,



Photograph by courtesy of the Italian General Headquarters

YOUNG AND SCATTERED FOREST GROWTH IMMEDIATELY BACK OF THE LINES ON THE HIGH ASIAGO PLATEAU—PURPOSELY LEFT TO PROTECT MEN AND SUPPLIES GOING TO AND FROM THE FRONT LINE TRENCHES. IT WAS PRACTICALLY WINTER THROUGHOUT THE YEAR ON THE HIGH ITALIAN ALPINE FRONT WHERE A CONSIDERABLE PART OF THE LINES WERE FROM 6000 TO OVER 9000 FEET IN ELEVATION



Photograph by courtesy of the Italian General Headquarters

ITALIAN INFANTRY AWAITING THE ORDER TO ADVANCE TO THE COUNTER ATTACK ALONG THE RAILWAY NEAR NERVESA ON THE MORNING OF JUNE 21, 1918, JUST AFTER THE AUSTRIANS HAD CROSSED THE PIAVE RIVER IN THEIR ATTEMPT TO REACH VENICE, PADUA AND MILAN. SOME OF THE BITTEREST FIGHTING OF THE WAR TOOK PLACE HERE AND AFTER TWO WEEKS OF CONSTANT STRUGGLE THE ENEMY WAS FINALLY HURLED BACK ACROSS THE RIVER WITH AN ESTIMATED LOSS OF 250,000 MEN. DURING THE LOWEST EBB IN THE MORALE OF THE ALLIES, THE ITALIANS MADE A GREAT STAND AND FINALLY WON ONE OF THE GREATEST VICTORIES OF THE WAR.

somewhat similar to the sharp rise of our own Rocky Mountains from the flat Colorado prairie. The line crosses Monte Grappa, Monte Rossa, dips down across the Val Brenta, crosses the high Asiago Plateau, dips once more in the double valley on each side of Monte Cimone and across Lake Garda, then rises across the highest parts of the Alps, including the Posilipo and the Postubio, to the Swiss border.

Through the kindness of the Italian war officials and the General Staff it was my privilege to investigate the conditions along practically the whole Italian front, including both the lines along the flat Piave River plain and the higher mountain country as well. Captain Scaravaglio, of General Headquarters, proved to be not only a courteous and gracious host but a most intelligent and well-informed officer on the conditions at the front. He had summured and tramped over a good section of this mountainous country. He said the whole mountain front had never been a heavily forested section. The upper slopes contained scattered stands of silver fir and Norway spruce, while the lower slopes, particularly in the gulches and ravines, contained open stands of chestnut and oak. There was a good deal of young growth and middle-aged timber, and sporadic attempts had been made at reforestation on the more favorable locations. In some of the upper valleys, particularly on the Asiago Plateau, there were good stands of silver fir and Norway spruce, running from eight to twenty thousand board feet per acre or more.

As a result of continual fighting and heavy artillery bombardment, the whole mountain front has been practically cleared of all evidences of timber growth, in many cases the upper soil being so dotted with shell holes that

not a living plant is in evidence. Stumps of trees here and there give evidence of former stands of timber and shattered and broken trunks stand out like skeletons against the sky, the only remains of former timber growth.

The whole mountain section immediately appeals to one as being the most urgent subject for reforestation and it will require considerable effort and much money to bring back this beautiful mountain region to even the sparsely forested condition which it presented prior to the war.

Along the Piave River front, the country on both sides is one of the most fertile agricultural regions of the world, as the crop statistics substantiate, so that generally speaking, there has been little forest destruction. While on the battlefield of Montello a few days after the Austrians had been repulsed with great losses from their advance beginning June 15 across the Piave, an excellent opportunity was given to study the effects of shell and gun fire in an old chestnut grove back of the little village of Nervesa which had been used



Photograph by courtesy of the Italian General Headquarters

A COLUMN OF AUSTRIAN PRISONERS, GUARDED BY ITALIAN SOLDIERS, PASSING THROUGH ONE OF THE PICTURESQUE OLD WALLED TOWNS BACK OF THE PIAVE FRONT EN ROUTE TO CENTRAL ITALY FOR VARIOUS KINDS OF EMPLOYMENT. THE ITALIAN GUARDS MAY BE DISTINGUISHED BY THEIR STEEL HELMETS.

as the point of crossing on pontoon bridges by the Austrians. The trees had been torn to pieces as if a combined hurricane and electrical storm which had hit every tree, had recently destroyed the whole section. When a shell hits a tree the contact fuse causes an explosion and the shattering of the trunk or limb in both directions so that a severe splintering effect is the result. On Monte Grappa, which is the keynote of the whole mountain front, acre after acre has been literally "chewed up" by successive bombardments until the whole surface was a mass of shell holes. Near Monte Cimone not only the picturesque little Alpine villages but nearly every living thing in the form of a tree of any size has been destroyed as well. West of Lake Garda, the front was commonly above timber line at elevations of from 6,000 to 9,000 feet above sea level. Little damage to forest growth consequently is evident in those sectors.

Reforestation strikes the imagination at once as being the only salvation for this situation. The land is too rough and rugged to be suitable for agriculture and much of it is so rocky and precipitous that it is not even suitable for development into a grazing proposition. Before the war many parts of Italy were in serious need of reforestation but now that the war is over Italy should devote a large share of her efforts along the lines of reforestation in the devastated forest regions overlooking the fertile valley of the Veneto.

Undoubtedly the happiest and most contented in all Italy during the war were the Austrian prisoners. Asked if they wished to go back to their native land, the invariable answer was that even if they had an oppor-



THE FRONT LINE OF TRENCH ON MONFENERA, AN OUTLYING RANGE FROM MONTE GRAPPA, THE KEYNOTE OF THE ITALIAN MOUNTAIN FRONT. THIS HILL WAS FORMERLY FAIRLY WELL FORESTED. SCANT REMAINS OF TREES ARE SEEN IN THE RIGHT BACKGROUND. IN THE DISTANCE IS THE PIAVE RIVER, FLOWING ACROSS THE FLAT VENETIAN PLAIN. ON THE RIGHT OF THE RIVER IS THE MONTELO, WHERE THE AUSTRIANS BEGAN THEIR BIG OFFENSIVE OF JUNE 15, 1918.

tunity to get back, either by stealing away or by exchange of prisoners through Switzerland, they would

only be ill-fed, harshly treated, and forced to fight at the front once more. This prospect held out no attraction to these prisoners at all. Especially was this so in the case of the Hungarians, the Czechs, the Slovaks and the Slovenes.

It had always been a matter of interest what a country like Italy actually did with several hundred thousand of these prisoners, that is, whether they were kept in barbed wire stockades or employed on some useful and productive work. They are actually found doing almost everything in the way of physical labor throughout Italy. One finds them chiefly on railroad work, on construction of bridges, homes for refugees, clearing land, farm work, and all sorts of forestry work, and saw mill and woods work.

They are always used in small squads of from twenty-five to fifty or sixty and one is surprised at the comparatively small num-



Photograph by courtesy of the Italian General Headquarters

A MACHINE GUN LOCATION ALONG THE FRONT LINES BORDERING THE PIAVE RIVER. THIS IS A COMMON FORM OF PROTECTION FROM MACHINE GUN FIRE AS WELL AS ARTILLERY AND ENEMY AIRPLANES.



AN ATTACK OF THE ITALIAN INFANTRY ACROSS NO MAN'S LAND ON A HIGH PLATEAU. THE BARBED WIRE ENTANGLEMENTS HAVE BEEN BROKEN OR LOWERED BY THE ARTILLERY FIRE, PERMITTING THE TROOPS TO PASS THROUGH. THE FORMER VEGETATION HAS BEEN ENTIRELY SWEEPED AWAY BY GUN AND SHELL FIRE OR CUT OFF AND UTILIZED FOR FUELWOOD, SHELTER, TRENCH TIMBERS AND OTHER PURPOSES, BY THE TROOPS.

ber of armed guards that go with them. It was quite a customary sight to see only one armed Italian soldier guarding a bunch of prisoners. Asked about the danger of escape, almost always the invariable answer was that the men were so happy and contented that there was no danger whatever of their attempting to get away. Their only fear was a possible exchange of prisoners, in which case, there was anything but a pleasant prospect in store for them. The casual traveler in Italy was struck at once with the serious need of reforestation that is apparent almost everywhere. The ever-present rugged mountain topography in the Swiss and Savoy Alps of the north, the Apennines running almost the entire length of the peninsula, the Calabrian range in the south, and the mountains of Sicily present many glaring needs of reforestation. Added to this situation, the Italian forestry officials have been forced to cut many of their splendid forests to meet the great war emergency. Austrian prisoners, have, in many cases, been used to reforest these cut-over areas. Many of them have already had experience in reforestation activities in Austria and so are proficient in the work. The Italian forestry officials have adopted an excellent method of reforesting cut-over areas. In all areas cut over, and every effort is made to bring back the denuded areas to a well-timbered state once more. Many experiments have been made in reforestation at the Royal Experiment

Station at Vallambrosa, where there are seven nurseries, totaling about eighteen acres, and which have a capacity of about one million plants a year. As a result of these experiments, they have found that *Abies Pectinata* (Silver Fir) will produce the best results. For the past three years, before the war ended, Austrian prisoners had been preparing the seed beds at some of the State forestry stations in the Apennines, as well as doing the actual work of transplanting and field planting. In the seasons of the year when there is no planting or nursery weeding, or other work associated with reforestation to be done, the men are

employed about saw mills and in woods work, cutting down the mature timber, and on the work of transporting the logs to the mill, and in road and construction work associated with the general improvement of the forests.

Aside from silver fir, in some locations Norway spruce and Scotch pine are used for reforestation and to a limited extent some chestnut is planted. There is considerable beech on the higher mountains of Central Italy



Photo taken by courtesy of the Italian General Headquarters

ITALIAN INFANTRY IN ACTION ALONG THE PIAVE RIVER FRONT BELOW NERVESA WHERE THE AUSTRIANS MADE ONE OF THEIR THREE CROSSINGS IN THE BIG OFFENSIVE OF JUNE 15, 1918. NOTE THE CROOKED CHARACTER OF THE TRENCHES IN ORDER TO RENDER AN INEFFECTIVE AS POSSIBLE ARTILLERY FIRE DIRECTED AGAINST THEM. THE BRUSH IS ALSO PILED TO DISGUISE THE EXACT LOCATION OF THE TRENCHES. THE RIVER VARYS FROM ONE QUARTER TO OVER A MILE IN WIDTH BELOW THIS POINT.

but this is always left to reforest itself naturally. For reforestation work, silver fir, spruce and pine seedlings are kept in the seed bed for two years and for three years in the transplant beds. Before the war it cost about six lire, or about \$1.20 per 1,000 to produce these five-year-old plants. At that time, labor cost from 75 cents to \$1.25 per man per day. The planting alone, before the war, cost about 20 to 24 lire per 1,000 plants, or from \$4.00 to \$4.80. The total cost, therefore, of the plants placed in the ground would be from \$5.20 to \$6.00 per 1,000 plants. For the past three years this



Photograph by courtesy of the Italian General Headquarters

AN INTERESTING PHOTOGRAPH SHOWING THE METHOD EMPLOYED IN CAMOUFLAGING A HIGHWAY ALONG THE ITALIAN FRONT WITH BRUSH AND BRANCHES, PLAITED STRAW, WICKER WORK, MATTINGS, AND CLOTH WERE ALSO COMMONLY USED. GREAT QUANTITIES OF LUMBER, POLES AND TIMBERS WERE USED IN THE WORK OF CAMOUFLAGING THE HIGHWAYS, MUNITION DUMPS, ARTILLERY LOCATIONS, ETC.

cost has been materially lowered where Austrian prisoners were used, because the wages paid were comparatively lower and the cost of feeding the men was only about 20 cents to 35 cents a day per person. In setting the plants out in the field on areas recently clear-cut of mature timber, the silver fir plants are placed one and one-half meters

apart in every direction, that is, the spacing is not prepared in rectangular shape as is customary in this country. The pine and chestnut transplants are placed only two meters apart. It has been found that planting can be successful in both



Underwood and Underwood

TRULY A "NO MAN'S" LAND.

THIS IS THE SHELL-TORN FOREST ON THE PEAK OF MONTE GRAPPA OVER WHICH THE ITALIANS DID THEIR FIGHTING TO STOP THE AUSTRIAN OFFENSIVE OF JUNE 17, 1918. STUMPS OF TREES AND SHATTERED AND BROKEN TRUNKS STAND OUT LIKE SKELETONS AGAINST THE SKY, THE ONLY REMAINS OF FORMER TIMBER GROWTH.



Italian Official Photograph

A HEAVILY SHELLED PORTION OF THE AUSTRIAN TRENCHES AFTER THEIR CAPTURE BY THE ITALIANS. NOTE THE "CHURNED" APPEARANCE OF THE GROUND AND EFFECT ON THE TREE GROWTH OF THE VICINITY.

the spring and fall, but particularly in the Apennine Mountains of Central Italy centering about Tuscany. Planting usually begins in March on the lower slopes, while at the higher elevations, running up to three and four thousand feet, planting is done as late as the middle of April and even as late as early in May. The plan of reforestation calls for improvement cuttings every ten years and at maturity the whole areas are clear-cut and replanted at once.

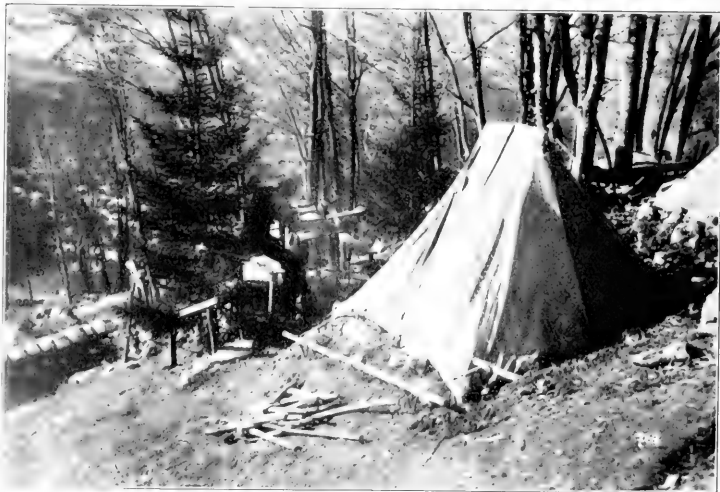
Silver fir is usually cut when mature at ninety years of age. Beech is cut at from ninety to one hundred and twenty, unless desired at an earlier age for charcoal purposes, and the Scotch pine and spruce are cut at from one hundred to one hundred and twenty years. The officials have decided to plant pure forests, that is, an area is planted with pure fir or pure pine, as it has been determined that the quality is inferior when these trees are grown in mixed forests in that region.

While at Boscolunga, one of the most important State forests along the crest of the Apennine Range between Florence and

Austrian prisoners worked and lived and felt about their life as captive prisoners in foreign land. In talking with

them they all seemed satisfied with what they were doing, all certainly looked well-fed, and none of them expressed a desire to get back before the war was over. One bright and husky young Hungarian had had two fingers cut off in an accident in the saw mill, but in reply to a question about whether or not he wished to return, he said that he wanted to remain there after the war and get employment in the saw mill if they would take him. The manager said he was one of the best workers about the place and he hoped that he would remain after the war, as he found him one of the most faithful and efficient among those in his employ. The men slept in clean and commodious bunk-houses which reminded one so much of some of those attached to the Ranger stations in our

national forests in the west. Each man had a clean, separate bed and the food was the same as that given to the Italian soldiers. A typical daily menu would be about as follows: For breakfast, war bread and coffee (practically the same as is served in all the hotels, that is, without butter, sugar, marmalade or preserves, etc.). For dinner at noon they received a thick vegetable soup or stew, and macaroni, with bread and a little wine. For supper, they received usually "Risotto" or rice, served up in one of the many styles for which the Italian chefs



AN OBSERVER'S LOOK-OUT CAMP IN THE HIGH MOUNTAINS OF THE ALPINE FRONT, PROTECTED FROM DETECTION BY THE ENEMY BY THE SURROUNDING FORESTS. THIS WAS ONE OF THE MANY CAMPS IN THE HIGH MOUNTAIN FRONT BETWEEN THE BRENTA AND PIAVE RIVER VALLEYS. IN THE DISTANCE IS SHOWN ONE OF THE DEEP INTERIOR VALLEYS OF THE MOUNTAIN FRONT.



Photograph by courtesy of the Italian General Headquarters

A COMMUNICATION TRENCH IN A HEAVILY SHELLED PORTION OF THE ITALIAN FRONT. THERE WAS FORMERLY A GOOD FOREST GROWTH IN THIS SECTION BEFORE THE WAR. ALL TREE GROWTH NOT DESTROYED BY THE TERRIFIC SHELL FIRE WAS USED BY THE SOLDIERS FOR FUEL PURPOSES, FOR TRENCH FACING, DUG-OUTS, DUCK-BOARDS, ETC.

are famous, bread, coffee and tea, and a dish of vegetables, such as beans, potatoes, or meat hash. One might ordinarily ask if there were no desserts served. However, no sweets, such as cake, pudding, pie, etc., were served anywhere in Italy during the war. The only dessert offered at the hotels was fruit and occasionally some cheese.

By way of contrast with these well-fed, happy and contented prisoners, an opportunity was afforded at Genoa to see how some of the repatriated Italian prisoners returning from Austria appeared. We helped to feed a whole trainload as they came from Switzerland, and the poor soldiers were the most emaciated men that can possibly be imagined. They fairly fought for the food which was rushed to them at the car windows. Another trainload of returned prisoners from Austria stopped a short while later and the food could not be served because the men were in such serious condition that they could not be fed the coffee, chocolate, eggs, sweet chocolate, fruit, etc., which the Red Cross organizations had prepared for them. The men

were too weak to rise from their bunks on the train, and the glaring eyes, sunken cheeks, and pallid complexions bore silent witness of their terrible treatment in Austria. We were informed that many of the poor boys died before they reached their destination at the hospitals along the Italian Riviera.

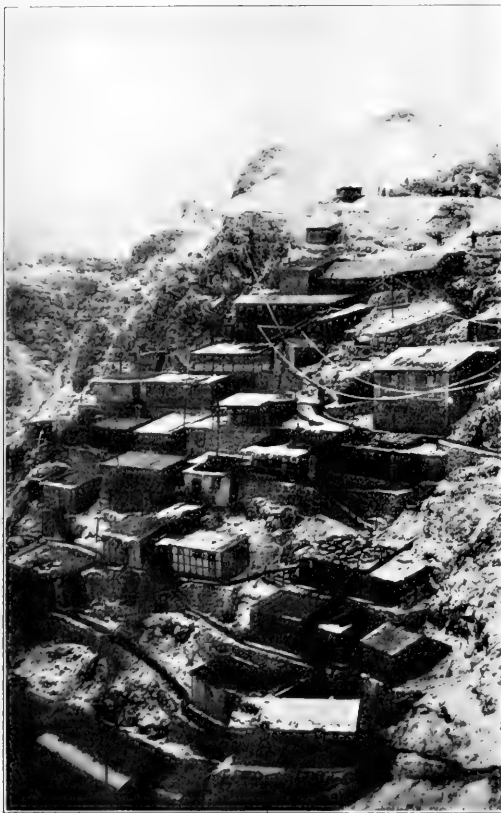
Many acres of land have been reforested in Italy during the war, not only by Austrian prisoners but by women, men past the military age, and by young boys and girls, but after the war throughout Italy there will be a great need for reforestation of these devastated acres and the denuded and bare mountain slopes. No one appreciates these needs better than do the Italian forestry officials themselves and there are plans already under way to provide funds whereby most rapid progress can be made.

By way of comparison with forestry in this country, the situation in Italy is most interesting. The first impression in visiting Italy is the vast resources in timber growth in this country, the great variety and individual size of the tree species, a well defined and supported national forest policy and the



Italian Official Photograph

IN ONE OF THE BEST SPRUCE FORESTS NEAR THE LINES ON THE ASIAGO PLATEAU NEAR THE VAL BRENTA SO OFTEN MENTIONED IN THE COMMUNIQUEES FROM THE ITALIAN GENERAL HEADQUARTERS. VERY LITTLE OF THE FOREST ON THE HIGH ALPINE FRONT WAS AS FORTUNATE AS THIS IN ESCAPING THE ARTILLERY FIRE OF THE ENEMY. EVEN THIS FOREST HAD BEEN HEAVILY CUT OVER TO PROVIDE MUCH NEEDED TRENCH TIMBERS, CAMOUFLAGE POLES AND FUELWOOD FOR THE TROOPS.



BARRACKS OF THE ITALIAN TROOPS ON A PROTECTED SLOPE IMMEDIATELY BACK OF THE FRONT "SOMEWHERE" IN THE ITALIAN ALPS. NOTE THE TELIFERRICO USED TO BRING UP SUPPLIES AND TAKE DOWN THE WOUNDED.

most highly developed lumber manufacturing industry, as compared with similar features in Italy.

Forestry in Italy may be described as a direct reflection of her political and economic history. It must be remembered that Italy, although old historically, is young politically, and that until comparatively recent times, she has passed through a rapid succession of political changes which have wrought great havoc not only with her forests, but her industrial and economic development as well. Italy is often regarded in this country as a land of old historical associations, of interesting old Roman ruins, the land of poetry, painting and the opera—a sort of "dream land" which annually attracts its large quota of tourist travel. This impression is quite a natural one, but Italy is much more than is most often associated with it. The war has greatly unified and strengthened the nation, and with the development of her important water power properties and the conversion of her great munition plants to peace-time activities, her industrial future is well assured in spite of the lack of such import-

ant fundamentals for development as coal and iron resources.

For many centuries and until the year 1870, Italy was under Austrian and Spanish rule or was largely made of small individual kingdoms, principalities and papal states, which were highly jealous of each other. As a result of these long continued and seriously disturbed conditions, forestry has suffered severely. Early Roman records show that the practice of forestry was considered, and even adopted in some of its primitive forms, in the days of the old Roman Republic as written records of Pliny and Horace give evidence to posterity. Although one is impressed with the small size of trees, and the unsatisfactory condition of a large portion of the Italian forests, there are many evidences still extant which bear witness to the fact that the country was, at one time, well forested. The Italian peninsula is essentially a mountainous section, and the greater part of the entire Apennine Range was once well covered with beautiful forests. For example, in such splendid old structures as the Palazzo Vecchia in Florence, there are many large beams up to 16 x 16 inches in cross-section, and some even as large as 20 x 24 inches, and from 50 to 70 feet in length, which have been in constant service for practically a thousand years.

With the establishment of the present unified Italian Kingdom in 1870, forestry in Italy received considerable attention from the government authorities, but there were many difficulties and drawbacks in the way of governmental control, and the better handling of the forest resources. In the first place, the government was embarrassed with the lack of sufficient available funds, and most of the forests had been so heavily cut over and burned that there was a scant remnant of the original forest cover. Then too, the old practice of cutting the young and growing forests for charcoal had a most



Photograph by Nelson C. Brown

THE HEADQUARTERS OF THE ITALIAN GOVERNMENT INSPECTOR AT ABETONE IN THE FOREST OF BOSCOLUNGO. THE FOREST INSPECTOR HAS HIS HOME HERE, AS WELL AS OFFICE. THIS IS A FAVORITE RESORT OF THE ITALIANS DURING THE HOT DRY SUMMERS.

deteriorating effect on the condition of the forests.

Just prior to the outbreak of the great war, however, forestry in Italy received a new impetus with the establishment of a much larger and better organized technical force and provision by the government for a greatly increased appropriation for operation and maintenance.

The total area of Italy, including the islands of Sicily and Sardinia, consists of about 71,500,000 acres, which is equivalent to the combined area of the states of New York and Pennsylvania, Massachusetts, Connecticut and New Jersey. Within this comparatively small area, a population of 36,000,000, more than equivalent to one-third of this country is congested.

Of the total area of Italy, only 17.64 per cent is now covered with forests. Italian forestry officials estimate



Photograph by Nelson C. Brown

A VIEW IN THE LUMBER YARD OF A SAW MILL OPERATED EXCLUSIVELY ON WAR ORDERS IN CENTRAL ITALY. WOMEN WERE COMMONLY EMPLOYED IN YARD WORK OF THIS KIND, AS SHOWN IN THIS PICTURE, OWING TO THE SCARCITY OF MEN. THE LUMBER SHOWN IN THIS VIEW IS BEECH. THE BEST BOARDS WERE SELECTED AND USED FOR AIRPLANE PROPELLERS, THE REMAINDER BEING USED FOR FRENCH TIMBER BARRACKS, ARTILLERY WORK, AND FOR MISCELLANEOUS NAVAL PURPOSES.

that at least 32 per cent of the total area of the country should be covered with forests. The production of wood is only one of the several important factors entering into the necessity for better forestry in Italy. The maintenance of a continuous water flow for her water power properties, for example, is one of the very most important features. The prevention of erosion on the steep mountain sides, is also an important feature of forestry and its function in Italy. Moreover, the aesthetic side of forestry in Italy has not been neglected any more than in this country. In fact, aestheticism plays such an important part in the national life of the people that the development of her forests along this line, combined with its recreational features, are destined to play a very important part in the future of Italian forestry. Already certain state forests have been set aside and designated as summer resort forests, where cutting is only to be permitted to maintain the forests in best condition, and



Photograph by courtesy of the Italian General Headquarters

A HIGH LOOK-OUT FROM THE TOP OF A LOMBARDY POPLAR ALONG THE ITALIAN FRONT. VANTAGE POINTS SUCH AS THIS MADE EXCELLENT OBSERVATION POSTS TO DETECT ENEMY MOVEMENTS.

they are not to be regulated along the usual forestry principles.

Of the 12,565,000 acres of forest in Italy, which is equal to about the total forest area of New York in this country, a large share is located in the mountains. About 6,700,000 acres are classified as being located in the mountains, and about 3,800,000 acres in the lower hills, the remainder being in the valleys and on the plains. Only 3.8 per cent of the total area of forests in Italy are owned and controlled by the Central Government. This



Photograph by Nelson C. Brown

LUNCH TIME ON THE RESERVE LINE AT LOSSON ABOUT A MILE FROM THE FRONT LINES ON THE LOWER PIAVE RIVER FRONT. JUST BEFORE THIS PHOTOGRAPH WAS TAKEN THIRTY FIVE AUSTRIAN SHELLS WERE DROPPED IN THIS VILLAGE DOING CONSIDERABLE DAMAGE TO THE CAMPANILE TOWER SHOWN IN THE BACKGROUND.

equivalent to only 270,000 acres as compared to the area contained in our national forests, which embraces a total of about 160,000,000 acres.

The municipalities and communes in Italy are very important owners of forest property, the total per cent being 43.2, while the private owners, lumber companies, etc., own 53 per cent of the total area. Large areas of forests are still retained by many old ancestral estates which have been handed down through the same family, for the past several centuries. On some of these estates



Photograph by courtesy of the Italian General Headquarters

DURING A LULL IN THE FIGHTING AT ONE OF THE ITALIAN BATTERIES BELOW CAPO SILE IN ADRIATIC TIDEWATER, ON THE LEFT ARE SOME LARGE NAVAL GUNS PROTECTED WITH SAND BAGS, ETC. THE ITALIAN OFFICER ON THE RIGHT IS PROFESSOR DINO BIGONGIARI OF THE ROMANCE LANGUAGE DEPARTMENT OF COLUMBIA UNIVERSITY WHO WENT BACK TO ASSIST HIS NATIVE LAND ON THE OUTBREAK OF WAR. BACK OF HIM IS AN OUTDOOR DINING ROOM PROTECTED WITH CAMOUFLAGE AND THE WRITER STANDS NEXT TO HIM.

the forests are being handled on scientific principles of forestry, but most of them present an exceedingly poor appearance.

The number of tree species in Italy is probably greater than in any other country in Europe. All of the trees found in the Mediterranean section are to be seen in Italy, whereas on the higher elevations, tree species which are commonly found in Northern Europe, in such countries as Norway, Sweden and Finland are frequently found. The greatest variety is among the hardwoods. But the total variety of species does not compare with those found in this country. For example: It is estimated that there are at least 500 separate and distinct tree species found in this country, whereas in Italy, there are only about sixty. As against about fifty important commercial species, in this country, there are only about twenty in Italy. The hardwoods, broadly speaking, occupy 89 per cent of the total forest area of Italy. A good share of this is oak and chestnut forest, the size and general appearance of which is very disappointing to one familiar with the splendid virgin hardwood forests found

in the Appalachian and lower Mississippi Valley sections in this country.

The conifers or soft woods occupy only 6.9 per cent of the total forest area. On this very small area, however, the very best part of the commercial lumber is contained. In fact, some of the soft woods are the only trees which grow to a size comparable in diameter and height to some of our better soft wood stands in this country. These are limited to the higher elevations of the Apennine Mountains and the Alps of Northern Italy. In these limited sections, silver fir and Norway spruce are often found up to 140 feet in total height, and sometimes, from 40 to 50 inches in diameter. Stands of silver fir planted 100 years ago produce 75,000 to 100,000 board feet per acre as a maximum. Some limewood and tops for fuelwood and the manufacture of charcoal are also yielded from these heavy stands. The remainder of the forest area of 4.1 per cent is made up of mixed hardwoods and soft woods. It is very evident, therefore, that the two seldom grow together.

The oaks are the principal hardwoods found in Italy and there are four species, namely, two white oaks, one



Photograph by Nelson C. Brown

THOUSANDS OF SILVER FIR LOGS CUT CLEAN ON ONE OF THE ITALIAN NATIONAL FORESTS, ALONG THE CREST OF THE APENNINE MOUNTAINS. BEFORE THE WAR THIS FOREST WAS CONSIDERED SO REMOTE AND INACCESSIBLE THAT THE LUMBER COULD NOT BE MARKETED AT A PROFIT. WITH THE USE OF HUNDREDS OF MOTOR TRUCKS AND AN OVERHEAD CABLE SYSTEM, THESE LOGS WERE BROUGHT DOWN AND UTILIZED FOR THE WAR PROGRAM. BEYOND THE FALLEN LOGS AND BEFORE THE YOUNG STANDING TIMBER MAY BE SEEN ROWS OF YOUNG TREES PLANTED IN THE SPRING OF 1916 AFTER A "WAR CUTTING" HAD BEEN MADE.

red oak and one live oak. Cork oak and a few other oaks of little importance, are also found, but, aside from the cork oak, are of negligible value. The two white oaks are the *Quercus sessiliflora* and *Q. pedunculata*. The red oak is the *Q. cerrus*, and the live oak is the *Q. ilex*. Most of these oaks seldom attain a diameter of 20 inches or a total height of 70 feet. Probably 40 to 60 per cent of the total area of oak forests are periodically

cut off at an early age, for the making of charcoal which is in heavy demand in Italy.

The demand for charcoal is probably the greatest single factor preventing better forestry in Italy. Sprout forests of only from fifteen to thirty years of age are frequently cut off for charcoal, and the trees are seldom permitted to grow large enough to yield lumber.

Silver fir and Norway spruce are, next to oak, the most important producers of lumber and forest products in Italy. There are a few fir forests in Calabria, in the toe of Southern Italy, which have been so remote from transportation facilities that the cost of cutting and transporting them to market was greater than the cost of importing lumber from foreign sources. The silver fir and spruce forests are restricted to the higher elevations of the Apennine Mountains and the Alps, bordering Switzerland and Austria. Although restricted in area, these forests grow to such splendid height and size, and so densely, that they are the most important forests from the viewpoint of lumber production in all Italy. Some of the most dense and heavily timbered forests in all

similar names to those used in this country, are of the same botanical family, but they all differ somewhat in the character of the wood, nature of the leaves, fruit and bark.

There are five varieties of the pine family in Italy. They are found growing chiefly along the shore lines of the peninsula. They are a particular feature of the Italian Riviera where they lend a most pleasing aspect to the already attractive landscape. All of these pines are very similar in general appearance, and seldom attain a height of over sixty feet or twenty-two inches in



Photograph by Nelson C. Brown

A HAPPY, SATISFIED, WELL-FED HUNGARIAN PRISONER WORKING ON ONE OF THE ITALIAN STATE FORESTS HIGH UP IN THE ALPINE MOUNTAINS OF TUSCANY.

Europe may be found at an elevation of about 2,000 feet at Boscolungo, Valombrosa and Mandrioli. The spruce is the same tree (*Picea excelsa*) which is so important in lumber production in Sweden, Finland and Northern Russia, and which is widely sold in the English lumber market under the name of white wood. In general characteristics and properties, it very closely resembles the Adirondack or Canada spruce. It has been widely planted in this country for both commercial planting and for decorative purposes. The silver fir is very similar to the balsam fir in the Northeast, but it grows to a very much larger size. Its scientific name is *Abies pectinata*.

All of the trees found growing in Italy which have



Photograph by Nelson C. Brown

FROM LEFT TO RIGHT, THE ITALIAN GOVERNMENT INSPECTOR OF THE FOREST OF BOSCOLUNGO, MR. MARTINETTI OF FLORENCE, MR. CAMILLO PARISINI, CHIEF ENGINEER OF FOREST CUTTINGS FOR THE ITALIAN ARMY, AND PROF. GIUSEPPE DI TELLA OF THE ROYAL FORESTRY COLLEGE AT FLORENCE.

diameter. They yield a soft, light and workable wood which is rather inferior on account of large knots and other defects. They are commonly referred to as "umbrella" or stone pines. Oftentimes the lower branches are trimmed up leaving a short but broad crown which gives the effect of an umbrella. One of these pines is the same Scotch pine, or redwood as it is called in the English lumber market (*Pinus sylvestris*) which is one of the most important lumber producing trees of Europe, and is exported in large quantities from Norway, Sweden, Finland and Russia. Another is the well-known Cembran pine which is held in very high esteem for wood carvings of all kinds, and more especially for the world famous Florentine frames and woodwork so much of which is made and exported from Tuscany in Central Italy.

Next to the pines, the Italian beech (*Fagus sylvatica*) is the most important wood produced in Italy. It is a favorite wood used for making charcoal. It is also used for boxing and crating stock, flooring and for fuel wood. In general appearance, it resembles very closely the beech found in this country, but it grows much smaller and is more defective than the beech found in our native forests of Wisconsin and Michigan.

The Italian poplar is regarded very highly, especially for the purposes of making interior frames of airplanes

and for miscellaneous wood work purposes. It is much stronger and heavier than the native poplar and cottonwood found in this country. There are two species of Italian poplar.

It is estimated that there are over 1,000,000 acres of chestnut forests alone, in Italy. It is composed entirely of one species which, in external appearance, resembles the American chestnut, but which seldom grows to such large size. Its greatest utility is in the production of sweet chestnuts of which around 800,000 tons were produced in Italy during the year 1918, and furnished an

It is very highly prized as it is a wood of excellent qualities for use in cabinet, high-grade furniture and flooring work. It is even exported to South America where it is held in great demand. It is also used for wood carving, inlaid work, paneling and interior finish.

Other woods are alder, cypress, elm, mulberry, maple, birch, ash and eucalyptus.

Italy is one of the most important lumber importing nations in Europe. It annually brings in about 1,000,000,000 board feet, valued at over \$35,000,000 to make up the deficiency of its local supply. During the war this normal importation was practically shut off, and the native forests were depended upon to supply a large share of not only the normal demand, but for the requirements of the war program, which were exceedingly large in Italy. As a result of this situation, the Italian forests have been very heavily depleted, and whereas they supplied nearly half of the total amount of lumber and forest



Photograph by Nelson C. Brown

A LOG YARD IN ONE OF THE FOREST OPERATIONS FOR THE WAR PROGRAM. THIS VIEW WAS TAKEN IN THE UPPER CASENTINE VALLEY IN TUSCANY, IN CENTRAL ITALY. NOTHING WAS ALLOWED TO WASTE ON THESE CUTTINGS, THE LUMBER BEING USED FOR BARRACKS, ETC., AND THE SMALL PIECES BEING USED FOR FUELWOOD AND CHARCOAL. EVEN THE LIMBS AND BRANCHES WERE USED FOR TRENCH FACING AND CAMOUFLAGE PURPOSES AT THE FRONT.

important part of the Italian food supply. In fact, it may be truthfully said that most of the Italian chestnut is protected and cultivated more for the production of the nuts than for the production of wood.

The larger size chestnut trees are used for poles, piling, vineyard stakes, barrel staves and miscellaneous lumber purposes. Most of the chestnut forests, however, grow on poor, rocky soil above the vineyards and olive groves, and the individual trees are exceedingly crooked, small and mis-shapen. They are not the kind of tree which lends itself readily to production of good lumber for this reason.

Italian larch (*Larix Europea*) is found only in the Alps of the north, at a very high elevation. It is only found as a scattered tree in the coniferous forests of the Alps and has never played an important part in the lumber markets owing to its scarcity. Its wood is very highly valued, however, on account of its strong, durable qualities.

There is a variety of other woods found in the Italian forests, and only one is of commercial importance, namely, walnut (*Juglans regia*). This tree is found growing here and there with other kinds of hardwoods.



Photograph by courtesy of the Italian General Headquarters

AN OLD ROMAN MOSAIC UNCOVERED IN DIGGING TRENCHES ALONG THE ITALIAN FRONT IN THE JULIAN ALPS. IT WAS PROBABLY PLACED HERE ABOUT 2000 YEARS AGO TO MARK THE BOUNDARIES OF ONE OF THE ROMAN PROVINCES OF THAT TIME. ROMAN COINS HAVE ALSO BEEN FOUND IN PREPARING TRENCHES ALONG THE FRONT LINES.

products required in the country before the war, it is estimated that the local production will play only an insignificant part in the future.

First, the spruce and silver fir adjoining the battle-front were cut off, and then the oak, beech and chestnut forests of the northern provinces of Lombardy, Venetia and Piedmont. This was done chiefly to save transportation to the front because the Italian railways were very heavily loaded by the necessities of the war program. They were called upon not only to send troops, ammunition and other supplies to the men at the front, but they were also used for the transporting of English

and French troops to ports on the southern coast where they were embarked for points in Macedonia, Mesopotamia and Palestine. At first, only the largest and best trees were cut, but as these became depleted, the secondary and more inferior trees were cut and the work progressed to the central, and even the southern provinces of Italy. Finally even the forests which had been classified as summer resort forests belonging to the state, had to be cut. The sacrifice of these beautiful forests such as Valombrosa, Camaldoli, Boscolunga, and others, severely hurt the Italian pride in their native forests. But



Photograph by Nelson C. Brown

A LARGE STATE NURSERY AT BOSCOLUNGA IN THE MOUNTAINS NEAR FLORENCE. THE SEED BEDS CONTAIN SILVER FIR WHICH AFTER TWO YEARS ARE TAKEN TO THE TRANSPLANT AREAS AND AT THE AGE OF FIVE YEARS ARE SET OUT IN THE FORESTS. ON THE RIGHT IS AN AUSTRIAN PRISONER EMPLOYED IN WEEDING THE SEED BEDS. ON THE EXTREME LEFT IS PROFESSOR GIUSEPPE DI TELLA OF THE ITALIAN ROYAL FORESTRY COLLEGE SPEAKING TO THE FOREST INSPECTOR OF THE DISTRICT. TO THE LEFT OF THE AUSTRIAN PRISONER IS MR. CAMILLO PARISINI, GENERAL MANAGER OF ONE OF THE LARGEST LUMBER COMPANIES CUTTING STATE TIMBER FOR WAR EMERGENCY PURPOSES.

the sacrifice was necessary for the winning of the Great War. The splendid state forests in Tuscany, Abruzzi and even in Calabria, were cut for the maintenance of a big army of 5,000,000 men at the front.

The effect on the Italian forests, therefore, must be very apparent. Italian forestry which was assuming considerable importance prior to the war, has received a serious set back, and damage has been done which will require a century or more to replace.

The personnel of the Italian forestry service, which is known as the "Servizio Forestale," is exceedingly high. It has a number of excellent, trained specialists on various phases of forestry, and it compares very favorably with the service of any of the other European nations. Prior to 1910, the Service received only meager support from the government as the annual appropriations only amounted to \$150,000. However, since that year, the annual appropriations were raised to 5,000,000 lire which is equal to about \$1,000,000. By way of comparison with our forest service in this country, which has, roughly,

about five and a half million dollars for an area of 160,000,000 acres, this is exceedingly good. Since the entrance of Italy in the war, however, in 1915, the annual appropriation was cut to 3,000,000 lire, which is equal to about \$600,000. These amounts include the support of the Royal Forestry College at Florence, and two ranger schools. The schools had no students on their rolls, during the war. The Forestry College received an equivalent of about \$40,000 annually both before and during the war. It was founded as early as 1869 at Valombrosa, and it continued there at the old monastery until 1911 when it was moved to Florence. The two ranger schools are located at Valombrosa and at Citta Ducale in the province of Abruzzi. The former had 150 students before the war, and the latter, 300.

The organization of the Italian Forestry Service consists of the director general in charge, who has his headquarters in the Ministry of Agriculture at Rome. Under him there are 13 chief inspectors, 47 inspectors, 28 assistant inspectors, 16 head rangers, 175 rangers, 425 brigadiers and 2,400 guards. The Forestry Service has



ON THE ASIAGO PLATEAU A SHORT DISTANCE FROM THE FRONT LINES WHERE SMALL PATCHES OF SILVER FIR AND NORWAY SPRUCE, PROTECTED BY THE TOPOGRAPHY, HAVE SURVIVED THE SHELL FIRE AND CUTTING FOR WAR PURPOSES. NOTE THE GREAT MASS OF BARBED WIRE ENTANGLEMENTS READY TO BE THROWN ACROSS THE ROAD IN CASE THE FRONT LINE IS BROKEN THROUGH BY AN AUSTRIAN ATTACK.

recently announced that wounded soldiers will receive preference for all of these positions in so far as they are physically able to perform them.

During the year 1914, the total receipts from the state forests was 1,309,427 lire, whereas the expenses were only 1,148,371 lire, leaving a net profit of 161,056 lire, which is, roughly, equivalent to about \$32,000.

In the management of the Italian State Forests, silver fir has been demonstrated to be the most successful tree. Its chief advantages are that it is easily regenerated; it grows rapidly; it is comparatively free from insect and other attack, and it yields a wood of excellent quality for the lumber market. It is usually cut at from 90 to 100 years of age, and the areas are replanted immediately with five-year old trees. The latter are kept two years in a seed bed, and three years in transplant beds. They are spaced one meter apart each way, and it costs from about 26 to 30 lire, or roughly, from \$5.00 to \$6.00 per thousand trees for reforestation. An improvement cutting is made every ten years. Since the forestry policy was instituted in Italy in 1867, and down to June 30, 1912, 39,932 hectares or about 100,000 acres of forest land has been reforested at an expense of 15,085 lire, which is equivalent to about \$3,000,000 according to the official Italian statistics. The forestry officials have approved a reforestation policy of 81,764 hectares or about 200,000 acres, which only awaits funds for rapid execution. It is estimated that over 1,000,000 acres of forest have been completely destroyed and devastated along the Italian front during the war, and it is believed that the only solution to the difficult problem is reforestation.

To supply her enormous lumber needs Italy can now look to only Switzerland, the United States and Canada. Before the war she imported about 75 per cent of her lumber from Austria and about 7/9 of her wood pulp from Germany and Austria. Switzerland is normally an importer of lumber and can not long keep up its export, so that Italy will probably have to depend upon this country and Canada for all we can possibly send her.

Before the war Italy's home production of lumber was far short of her needs and great quantities of soft wood especially were imported. Since the war the situation has become more serious, all the more so because the war was fought in the precise region of Italy that is richest in soft wood. Not only the damages of war but the uneconomical use caused by the urgency of the demands for lumber for war needs caused the disastrous depletion. Soft woods and poplar in the war zone are said to have been forced to yield two or three times their normal production.

The new provinces to be added to Italy as a result of the war will give her new forestal riches, especially as most of the wood in the added territories is of the kind not common in Italy. But it is hardly sufficient to decrease even slightly the gravity of the situation and Italy must import large quantities of lumber in the coming years because of the increased demand of her industries and the necessity of rigorously sparing the forests situated within her old confines to allow them time for regrowth.

N. L. CAREY, forest assistant in the Olympic National Forest, has discovered what he believes to be the largest spruce tree in the world. It measures 16 feet in diameter $4\frac{1}{2}$ feet above the ground. It is on the south side of the Solduck River. The top was broken off 150 feet above the ground.

THE FIR

By Donald A. Fraser

O Forest Fir!

Standing so straight and so slender,

Gigantic, yet slender;

Spreading thine arms so benignly

In benison over thy kindred,

Why dost thou shiver and groan,

And moan like a spirit in anguish?

Dost hear the far axe being sharpened,

The blades that shall sever thy heart-strings,

And lay thee a-low in thy glory?

Moan not; for to all comes a season

When Earth calleth back what was
borrowed;

So he who shall shatter thy life-dream,

In turn shall his life-dream be shattered.

Then moan not, O Forest Fir slender,

And groan not in anguish and sorrow;

But stretch forth thine evergreen fingers

And touch on the strings of the wind-harp

A melody sweet and caressing,

A pean of love and forgiveness;

And breathe o'er the world so ungrateful

Thy resinous odors of healing,

Right on till the axe shall incise thee.

Perchance when thy last groan is uttered,

And the thunderous crash of thy death-
plunge

Shall melt in the aisles of the forest,

That God will begin a new era

For thee, a new lease of achievement;

And thus thy proud death shall accomplish

Far more than thy bourgeoning life-span,

O Forest Fir,

Standing so stately and slender!

THE GUARDIAN OF OUR FORESTS

BY ALICE SPENCER COOK

"UNCLE Sam's handy man" is what we call the forest ranger, the man who guards our National Forests, for his duties are probably more varied than any other officer in the Government Service. His life and activities are much of a mystery to the average citizen. Even in the western States where the National Forests are largely located, little is known of the men who protect the timber resources of the State, watch over the water courses and the game and stock, and patrol in general the great mountain reaches.

When the Service was new, the only qualifications demanded of him were those of a woodsman or a cowboy. "Book learning" was unessential, so long as he could swing an ax and ride a horse. He blazed the trail through untrod forests and over unnamed peaks, but he was not up on the "technical" stuff and, with the buffalo and bison, the pioneer and his prairie schooner, he had to go. The advancing strides of civilization demanded a scientific knowledge of the woods and engineering ability and forest schools soon turned out the requisite number of these college trained men, whose education in the theory of the management of the forest, supplemented by practical experience in

various lines of woods work, made them capable of performing their varied duties.

So the ranger has gradually developed from the uneducated, though faithful, frontiersman, to the clear-eyed, weather-bronzed young fellow with a vast amount of initiative and tact, a combination of cattleman, surveyor, timber cruiser, fire expert, telephone linesman, and, most of all, a first-class woodsman.

The little, old weather beaten shack has given way to a substantial cabin, furnished by the Government, and costing about \$1,000, which is situated near the largest town in his district. These cabins, which are invariably painted green and have "Old Glory" floating above them, are very attractive looking. In addition to a rent-free cabin, the ranger is furnished with all the fuel he requires, so he is never harassed with the coal bills which bring furies of care

to the brow of many a city dweller. He must, however, furnish his own horse, and a horse to a ranger is as necessary as a ship to a sailor; but pasture is furnished by the Government.

Each ranger has charge of about 200,000 acres, and is assisted by guards, who belong to the old school



Photograph by H. T. Cowling

HERE IS FOUND REALIZATION

Easy of access, what could be more soul-satisfying to the lover of beauty than this view of Lake Chelan at evening? Lake Chelan is in the Chelan National Forest, guarded by our rangers.

which demands brawn in addition to brain. One of his duties is to lay out the mountain trails, which he does with great engineering precision, oftentimes, of necessity, through thick underbrush and up steep mountain sides.

He puts in the telephone lines, which, as will be seen

later, are absolutely essential in the safe guarding of the forests, and on the forests where there is grazing, he has supervision of the Government grazing permits, which means that he must assist in protecting the sheep from wolf attack, make proper watering places for the stock, and see that the herders move their stock on other grazing lands before the grass is eaten so short that it will not come up again. He must also count the sheep, checking them for loss and for pasturage charge. He supervises in part the timber sales, cruising or making an estimate of the timber, and, after it is cut, scaling it so that the Government will derive the proper income from it.

He welcomes the campers who enter his domain, advises them of the safest trails, the best fishing streams, and the happy hunting grounds, which in this case

does not mean the Indian's paradise, at the same time warning them, very politely of course, as becomes a model host, not to leave their camp fires burning.

Near Portland and Seattle, there are two immense national playgrounds, which are open to the public for

camping purposes. The public is invited by folders, advertisements, etc., and is more than welcome to camp there for any length of time. For their convenience, the rangers erect, here and there, stone fire places for cooking purposes, and sees that the campers are supplied with quantities of wood for fuel. It is the

boast of the ranger that the water in the mountain streams is pure and fresh, and he makes good his boast by keeping the streams free of refuse of all kinds.

One playground, 47 miles from Portland, Oregon, on the highway which extends along

the Columbia River, is visited every pleasant Sunday by from 2,500 to 3,000 people; some to spend the day, and some the week-end or longer. They fish, hunt, or wander along the trails back into the mountains, whose wild and rugged beauty is balm to the heart of the city

dweller. Frequent signs tell where the trails lead and rude but storm-proof cabins, supplied with fuel, are erected at frequent intervals, as a refuge when lost.

The Government also issues free use or nominal charge permits to anyone who desires to put up a hunting lodge, and is given a piece of land, com-

prising about an acre, for this purpose. Timber for the cabin is furnished free of charge and is never missed, for in the Northwest there are from 50,000 to 200,000 feet of timber to the acre, and 5,000 will build the average house; there is enough timber on every



IN THE DARK WATCHES OF THE NIGHT

A wonderful cloud effect in the forest.



READY TO MAKE CAMP FOR THE NIGHT

The many visitors to the National Forests appreciate the value and necessity of the work done by the forest rangers, ever alertly on guard, day and night

acre to build from 10 to 40 houses. These permits are usually taken up by people in Washington and Oregon who wish to spend a few weeks or months in hunting and fishing. The tourists from the East usually take the main traveled roads, instead of the untried trail dear to the heart of the true Westerner.

It is a curious fact that approximately 75 per cent of the rangers are married to school teachers. You will wonder where all the school teachers come from in this sparsely settled region. This is partly explained by the fact that every district has at least one teacher, regardless of the number of pupils. Since 25 per cent of all receipts from the National Forests go to the counties in which they lie, to be used for schools and roads, they can well afford to employ a teacher at an attractive salary. An additional 10 per cent is expended by the secretary of agriculture upon the roads and trails constructed primarily for the benefit of settlers within the forests. In one district in Washington, there are but two "children," one a boy of 22 years of age, the other a girl of nine. These children are half breeds, their mother a full-blooded Indian, the father a white man, a

lated districts. The teacher lives with the family for the nine months of the school year, in their little wicki-up, 18 miles from the nearest railroad. This may sound very romantic until one remembers that the



HOME OF A RANGER

Typical ranger cabin in the less mountainous districts, Washakie National Forest, Wyoming.

Indians in that part of the country are not the "six-foot in their stockings" type, which romance and the movies love to picture. They are short and heavy set, and many of them are blind, owing to their unsanitary mode of living. They are neither energetic nor industrious, and are quite content to live in rude little huts, made by bracing a few logs against each other, and in these huts they live all winter long, with only an open fire to keep out the bitter cold. They live on fish, mostly salmon, which come up the mountain streams in the spring, mid-summer and fall, to spawn, but never get back to the ocean, as those which are not caught are dashed against the rocks and killed, or, having accomplished their purpose in life, die



AN UNUSUAL BIT OF SCENERY IN A NATIONAL FOREST

Spruce trees, with crowns whipped into peculiar, fantastic shape by the winds.

"squaw man," as he is scornfully called in that section of the country. But these youngsters receive individual attention seldom accorded to children in the more popu-



RANGERS PLANTING FISH

The rangers co-operate with the State fish and game commissions and are instrumental in planting, in the mountain streams, billions of fish fry, which play no unimportant part in the food supply of the country as well as furnish a means of recreation for city sportsmen.

a natural death. The Indians dry the fish which they catch by hanging them on the sides of their cabins.

These mountain streams are also well stocked with trout planted there by the rangers. The minnows are



BUILDING A TRAIL UNDER DIFFICULTIES

Frequently, in order to maintain the proper grade of a trail, it is necessary to remove obstructions of various kinds, such as trees, rocks, and even immense boulders, sometimes larger than the ordinary dwelling house. In the last case, this is accomplished only by the use of dynamite.

furnished by the state fish hatcheries and are sent out in 10-gallon milk cans, which the ranger takes up the streams on eight or ten pack horses. And thus, the supply of trout is renewed each year and is ever abundant for the campers.

In some of the National Forests, the rangers have attempted to secure the utilization of wild fruits in their communities by organizing picnics for the purpose of gathering these fruits. In the mountains of the Southwest, there are large quantities of wild grapes and cherries which make excellent jellies, while in Washington and Oregon, wild strawberries and huckleberries are found in great abundance.

But the chief duty of the ranger is to guard the forests from fires and fight them when they occur. During the course of the fire season, there are sometimes as many as 500 fires in a district, ranging in size from a few square feet to hundreds of acres. Owing to the unusually dry season and the many logging operations now located adjoining national forest timber, the number of forest fires, and danger from

them has greatly increased. You will wonder how so many fires could be started in the forests, far from human habitation. These are the three chief causes: railroads, campers and lightning.

It would be impossible to properly guard the forest were it not for that modern miracle, the telephone. There are from 40 to 100 miles of telephone line in each National Forest, extending along the principal tracks



READING SNOW SCALE

This is important since the amount of snow fall determines to a great extent the fire hazard for the following summer, as well as the supply of water available for irrigation purposes.

used by miners, campers, etc., and on up to the lookout stations on the mountain tops. Three of these lookout stations are situated on mountains over 10,000 feet high, which for 2,000 feet from the top are perpetually covered with ice and snow and resemble huge ice cream cones. And there, thousands of feet beyond the timber line, in little cabins, or lookout stations, carried piece by piece up the steep mountain trail, men are stationed all through the fire season to



RANGER COUNTING SHEEP

A band of sheep at Dutch Joe Corral, Bridger National Forest, Wyoming.

watch for the thin spires of smoke which mean the beginning of a forest fire.

When a fire is lighted, sometimes 25 to 30 miles away, he estimates its exact location by means of instruments for that purpose, and then calls up the ranger, who immediately rushes to the scene of the fire all the men at his disposal. If the fire promises to be more than a small one, he telephones or telegraphs to the nearest city for help. In case of a very bad fire, several hundred men are hurriedly gotten together and hastened to the fire. Fire fighting instruments and cooking equipment are already on hand and every one works day and night till the fire is under control. Not long ago, a fire was started by lightning way back in the mountains, 15 miles from the nearest habitation. In the course of an hour and a half after the fire had started, or at least after the smoke had risen through the trees, the ranger had

five telephone calls informing him, not only of the fire but also of its exact location. This shows how closely the forests are guarded and explains why most fires are not more serious than they are. But even with the greatest precautions, a smouldering fire left by careless campers, sparks from the smoke-stack and live coals from the fire of a passing train, or a lighted match thrown in some inflammable material in the forest, combined with an east wind, will often wipe out in an hour what nature has taken hundreds of years to create. And not one in a hundred upon reading the startling headlines in his favorite daily, "Millions in Lives and Timber Lost," realizes the brave fight that is made to keep this loss down. But what of the khaki-clad ranger, who with eyes quick and keen, dices with death in a losing game? He is "among the missing," and it's all in the day's work.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association.

BERKELEY, CAL.—By Luther Burbank Intermediate School: Edward Werner, John Gazanago, James Gimbel, Rollie Ramos, Martin Dall, Cladius Vinther.

MIDDLETOWN, CONN.—By Dr. Kate C. Mead: Arthur Leonard Johnson.

NORWICH, CONN.—By W. I. T.'s First Congregational Church: William Morgan Durr; by Mrs. James L. Case: William E. Perry.

WASHINGTON, D. C.—By Mrs. George Combs: The Patriots of the War.

COMMERCE, GA.—By First Baptist Church: Ellis Luthi.

TIFTON, GA.—By Harding Methodist Church: Joe J. Moncrief, Richmond Lovett.

KASBEER, ILL.—By Public Schools: Claus Larson, Walter Paden.

MURPHYSBORO, ILL.—By Public Schools: Will Connelly, Will Richards, Peter Weber, Ernest H. Rowald, Thaddeus Lee.

ROCKFORD, ILL.—By Memorial Tree Committee: Theodore Roosevelt, Soldiers and Sailors of Rockford.

SPRINGFIELD, ILL.—By Enos School: Miss Alice K. Flower.

WHITE HALL, ILL.—By White Hall Senior High School: Francis Grimes; by White Hall Round Table: Charles Martin.

CLAY CITY, IND.—By Betsy Ross Club: Robert Andrew, Edwin Shonk, Samuel Knipe, Jacob Miller, Russell McGriff, Albert Werremeyer.

EBENEZER, IND.—By Miss Cora Grapy: Elmer Andrews.

ELIZABETHTOWN, IND.—By Women's Welfare Club: Kent Voyles.

INDIANAPOLIS, IND.—By Country Club: Lieut. H. C. Colburn, McCrea Stephenson, Reginald Wallace Hughes; by Arsenal Technical High School: Alfred Sloan, Franklin Burns, Ralph Burns, Ralph Gullett.

MUNCIE, IND.—By St. John's Universalist Church: J. R. Hummel.

COUNCIL BLUFFS, IOWA.—By Second Presbyterian Church: Lieut. Richard E. Cook, The Honor Roll.

HARTFORD, KY.—By Mrs. S. O. Keown: Boys from Ohio County, Kentucky.

PADUCAH, KY.—By Robert E. Lee School: Norman E. Lovell, Harry Cornwell.

HARWICK, MASS.—By Park Commissioner: Leslie M. Clark, Valmer H. Bassett, Earle M. Chase, Clarence L. Berry, Josiah D. Nickerson.

MARBLEHEAD, MASS.—By Tree Warden Stevens: Lieut. Charles H. Evans, Irving E. Brown, John A. Roundy, William E. Brown.

RANDOLPH, MASS.—By Stetson High School: Lieut. John B. Crawford, Thomas D. McEnelly, Daniel J. McNeill, Lieut. Thomas W. Desmond, Charles G. Devine.

READING, MASS.—By Reading Park Commission: Ernest H. Leach, Clarence S. Eaton, Lieut. Edward J. Haines, Stanwood E. Hill, Thomas E. Meuse, Timothy E. Cummings, William A. Riley, Corp. Edward Walsh, Ralph E. Morey, William A. White, Sgt.-Major William G. Britain, Jr., Carl L. Coombs, Sgt. Chester G. Hartshorne.

EAST LANSING, MICH.—By Michigan Agricultural College: R. S. Welsh, I. D. MacLachlan, F. E. Leonard, W. R. Johnson, L. Crone, A. F. Edwardsen, W. T. McNeil, H. J. Sheldon, T. W. Churchill, E. E. Ewing, N. F. Hood, D. McMillan, E. E. Peterson, F. I. Lankey, D. A. Miller, L. P. Harris, S. D. Harvey, H. R. Siggins, L. J. Bauer, G. W. Cooper, F. H. Esselstyn, L. K. Hice, C. M. Leveaux, G. S. Monroe, J. S. Palmer, W. H. Rust, O. N. Hinkle, O. C. Luther, L. T. Perrottet, B. F. Smith, G. J. Williams, H. B. Wylie, E. Halbert, S. R. McNair, W. B. Lutz, O. W. Wissmann.

LANSING, MICH.—By Eclectic Society of M. A. C.: George Monroe, Hugh Wiley, Samuel McNair.

MOUND, MINN.—By Public Schools: George Kohler, Martin Shabert.

LAUREL, MISS.—By Dr. W. P. Davis: Lieut. Marvin Stainton, D. S. C.

BOWLING GREEN, MO.—By Reading Club: Erritt Sidwell.

FORT OMAHA, NEB.—By United States Army Balloon School: Maurice A. Reed, Oscar F. Lindh, Frank A. Kaczowski, Frederick T. Kaulitz.

CAMDEN, N. J.—By Whitman Improvement Association: Walt Whitman.

ELIZABETH, N. J.—By School No. 15: Theodore Roosevelt, Vincent Carroll.

RAHWAY, N. J.—By Mrs. Leillie Burt: John Franklin Burt.

BROOKLYN, N. Y.—By American Association for Planting and Preservation of Trees: Louis Goldberg.

MOUNT VERNON, N. Y.—By Jefferson School: Theodore Roosevelt.

SYRACUSE, N. Y.—By Oakhurst Grammar School: Howard Levy.

CINCINNATI, OHIO.—By Cummins School: Cooper Schroder; by Linwood School: Albert Mider, Grant Long; by General Protestant Orphan Asylum: Charles Banger, Charles Stratmeyer.

COLUMBUS, OHIO.—By the Altrurian Club: Sgt. W. E. Wolfersberger.

NEW LEXINGTON, OHIO.—By Mr. A. D. Fowler, Scout

"ROADS OF REMEMBRANCE"

IN THE days when all Gaul was divided into three parts the wise men knew the value of good roads.

The Appian Way, built in 312 B.C., is still an excellent highway and France today has good roads, for she began building them in 1556. In 1820 Macadam, the English highway engineer, introduced his methods into France. In this country, however, the good roads idea had to pass through the "crank" stage and then the "enthusiast" stage until now the country has a road building program under way that will cost about a half billion dollars, counting state and federal activities. Good roads have suddenly become a business proposition and they should also become a basis for the beautification of the country and something more than a strip of concrete baking in the sun in summer and smothering in the snow

bridges and libraries, all to be included in one country-wide plan or unit.

Here in our own country Minneapolis has the greatest plans for a memorial drive under way, for the Board of Park Commissioners there is planning for fifty years from now. Theodore Wirth, the superintendent, is going ahead with plans by which he claims Minneapolis will have one of the show places of the American continent in 1950. Improvement of the Glenwood-Camden Parkway has been begun and C. M. Loring, "the father of the park system of Minneapolis," has set aside \$50,000 for the care of the trees. The vase type of elm is to be used and these trees are now being shaped in the nurseries in order to be ready for planting in the spring of 1921. There will be six rows of trees for



DEDICATION CEREMONIES

Thirty-six trees were planted at the Michigan Agricultural College in honor of the graduates who gave their lives in the war. A memorial tablet imbedded in a big boulder was unveiled.

drifts in the winter. To avoid this the American Forestry Association has pointed, as a solution, to "Roads of Remembrance"—the planting of memorial trees, memorial groves and even memorial forests at such places as are deemed best. We hear much of memorials but why not let memorial of stone wait until the proper setting along a "Road of Remembrance" can be found?

Memorial tree planting on a big scale is planned according to William Carroll Hill, secretary of the Pilgrim Tercentenary Commission, in connection with the three hundredth anniversary of the landing of the Pilgrims in 1920. Daniel Boone died in 1820 and as there is now a Boone Memorial Highway the American Forestry Association has suggested that memorial trees be planted along the road to mark the centenary. There are several proposed highways in honor of Colonel Roosevelt, the leading apostle of the great outdoors. In Great Britain memorial plans are of the widest scope, for they include housing, "Roads of Remembrance,"

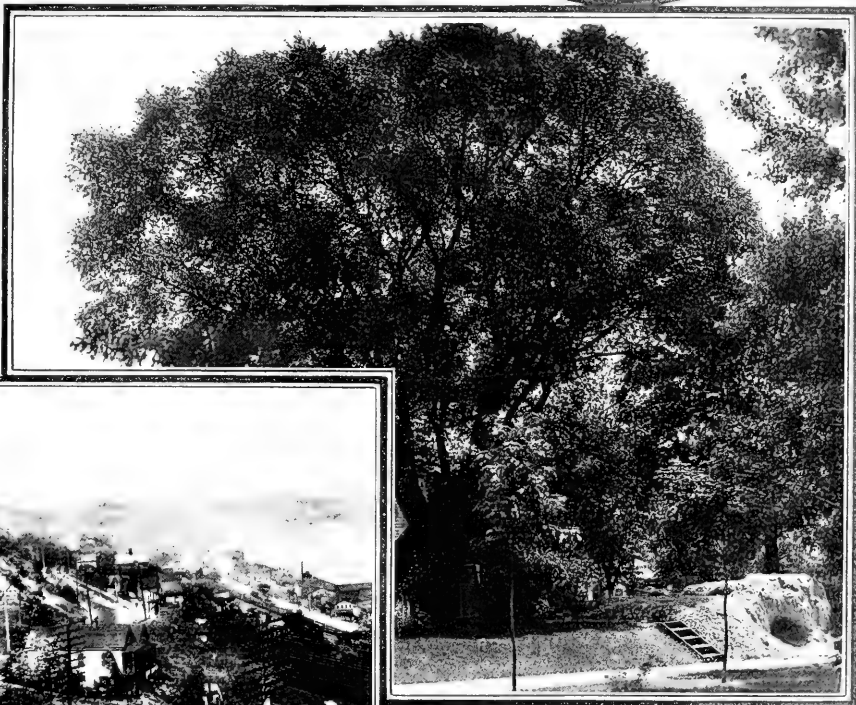
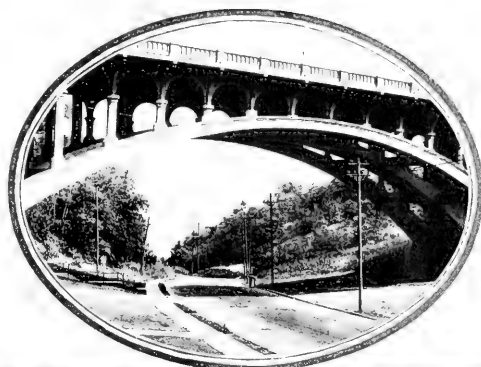
nearly two miles and four rows of trees for one mile. The trees will be planted 60 feet apart in both directions. Cincinnati, too, has under consideration a wonderful plan for a memorial drive that includes the widening of Fifth Street in the down-town section, and connecting up with a boulevard now in existence. James P. Orr, who, with F. W. Garber, the architect, was first to suggest the plan is enthusiastic for memorial tree planting.

In Canada, the Ontario Highway Association has plans up for a highway from Ottawa to Sarnia, across the river from Port Huron, where the Victory Highway cuts across Michigan. This in turn connects with the Lincoln Highway which crosses the Jefferson Highway near Ames, Iowa. The Jefferson Highway runs from New Orleans to Winnipeg. Thus it will be seen there are great possibilities for memorial tree planting along an international drive. The tree planting in Michigan is assured and the stretch of the Jefferson Highway in

Louisiana has been planted with Victory Oaks. Governor Pleasant of Louisiana, and a party of motor enthusiasts, have just completed a run from New Orleans to Winnepeg.

Memorial tree planting this fall will be done on a bigger scale than ever before. Inquiries have been coming into the Association for three months in regard to proper planting and the registration of the trees on the national honor roll. From every section of the country requests are coming for the bronze marker to identify the individual tree. East St. Louis has big plans under way for tree planting, and plans are going forward to interest the entire city by planting memorial trees and thus allowing the citizens themselves to have a big part in beautifying the city. Mayor Henry B. Chase of Huntsville, Alabama, has just informed the Association that the

Grace Club, of which Mrs. Owen Graham is president, plans a memorial avenue for fifty-four boys from that county who lost their lives. The town of Southwest LaGrange, Georgia, has memorial tree planting



plans under way, so Mayor C. O. Coleman advises. The Bingham, Mexico Chapter of the Daughters of the American Revolution, of which Mrs. S. J. Whitney is the regent, has planted a large number of memorial trees. The Michigan Agricultural College has dedicated 36 trees in honor of men from that school and Prof. A. K. Chittenden has sent in the names for enrollment. The city of Dallas will take up memorial tree

The picture in the center is of the famous elm at Huntington, Indiana, which was saved by changing the plans of the Christian Science Church there. The picture in the oval and the one below, by the Times-Star, show the possibilities of a "Road of Remembrance" planted with Memorial Trees, similar to the plan Cincinnati now has under consideration.

planting on a big scale, Alfred MacDonald reports, and the *Evening Post*, of Worcester, Massachusetts, has taken up the campaign there for a memorial grove. Prof. F. A. Boggess, of the University Hall School, of Boulder, Colorado, reports a very interesting program in connection with the dedication of a memorial tree in honor of four former students who gave their lives to their country. An avenue of flags leading to the tree was a unique feature of the program in which the pupils took part. Schools and colleges are taking up memorial tree planting extensively not only in honor of students and graduates but to mark their own graduation. Thus it will be seen these classes will have trees of their own to come back to at the reunions held ten and twenty years later.

Lester Park, the most beautiful and best known park in Ogden, Utah, was, in April, the scene of a very unusual ceremony in the annals of the Forest Service. The members of the office of the District Forester, located in that city congregated in the park for the purpose of observing Arbor Day and to pay respect to the memory of three co-workers in Forestry who sacrificed their lives in the world conflict. Forest officers are particularly interested in the planting of and caring for living trees, and a fitting method of honoring

them was believed to be in planting trees, since two of the men had especially fitted themselves for this particular line of work and the other was an active member of the Forest Service at the time of his death. These three men were Captain Homer S. Youngs, Lieutenant Hubert C. Williams and Forest Ranger Rudolf E. Mellenthin. The first two died in France and the last was killed while arresting a draft evader.

District Forester L. F. Kneipp, who made the principal address, said in part:

"There are few things that man can do to show his faith, his gratitude and his ideals which are more simple than the planting of a tree—and yet, there are few things that are more effective. A tree is a living memorial, often more enduring than marble or bronze. A tree is a thing of beauty and of inspiration; a living token of the wonder and glory of nature; a symbol of service.

"For the life of a tree is a life of service. It gives a touch of beauty to a barren waste; it enriches the ground upon which it stands and protects it from the destructive elements; it affords the birds of the air a nesting place and

shelter from the storms; it tempers the keen edge of the blizzard and the blasting touch of the drouth; its buds and its leaves are marvels of decorative beauty, and its fruits a source of sustenance and life. Even the end of life is not the end of a tree's service; to the contrary, the end of life opens new fields of service and utility which add immeasurably to our civilization and our culture and our happiness.

"Because this is true, it follows naturally that one who loves trees must love beauty and unselfishness; must cherish high ideals and lofty traditions. The mere planting of a tree is an example of unselfish service, for few men can live to enjoy the full fruit of their labor and none can help but share the reward with their fellowmen.

"It is not surprising that when the call came to save the world from the threat of barbarism the men who loved trees, who worked among trees, were quick to respond. It is not surprising that men like Youngs and Williams and Mellenthin gladly sacrificed themselves that their ideals might endure, ideals that to them meant more than life itself.

"Nothing that we can do to honor their memory; to display our gratitude and appreciation, could be more fitting than that which we are doing to-day. May we not hope that these trees we are planting here will stand for generations, living memorials, not only to these men who made the supreme sacrifice, but also to the ideals which they cherished and for which they gave their lives?"

At the conclusion of Mr. Kneipp's address, a black walnut tree was planted in memory of



MEMORIAL TREES PLANTED FOR FORESTRY BOYS

District Forester Kneipp, Assistant District Foresters Fenn, Morse, Metcalf and Woods and other members of the United States Forest Service observing Arbor Day and commemorating fallen heroes by planting black walnut trees in Lester Park, Ogden, Utah.

each of the three men and a short history of the life of each was given by a member of the Service.

The people of the country are all interested in trees as never before. Through tree planting they will see the value of groves, through groves they will see the value of forests, through forests they will quickly see the value of a national forest policy. The ground work for big things is being put in place by the Association. Every member can have an important part in this work by co-operating. Tell your friends of the work of your association. Keep your editors informed. Take the lead in tree planting in your own community. The American Forestry Association has ready an ideal program for a tree planting day and wherever you see such activities planned, inform those in charge that your association will be glad to help in every possible way. Each member will get out of the association just what she or he puts in it. The opportunity for returns in satisfaction, in the promotion of the community spirit which bloomed during the war, and in the betterment of your country, were never greater than in co-operation at this time in the work the American Forestry Association has before it. Let there be many trees as a memorial to your endeavors.

A NATIONAL FOREST POLICY

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER, HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—Editor.

FOREST ECONOMICS: SOME THOUGHTS ON AN OLD SUBJECT

BY WILSON COMPTON

SECRETARY-MANAGER, NATIONAL LUMBER MANUFACTURERS' ASSOCIATION

NO well-informed American denies the need for a national plan for efficient forest utilization and adequate replacement of timber. But this is only the statement of a *problem*, not of its *solution*. Although there may be general agreement as to the nature of the problem, a veritable encyclopedia of argument and discussion might not suffice to secure agreement as to the answer.

Most of the public discussion of Forest Policy has heretofore originated among the foresters. Some of the policies publicly advocated may represent the general opinion of the profession. "Public opinion," however, we have learned, is not the opinion of the most people but the opinion of those who talk the most, or the loudest. It is therefore of doubtful propriety to attribute to the profession as a whole the sensationalism and faddism of a few men having apparently no permanent attachment to a substantial forestry enterprise, whose concepts of forest economics are apparently quite unsoiled by contact with the facts of industry, and whose self-constituted interpretation of the public interest is vague and mocking.

As a plain citizen, interested in whatever will promote national welfare, I am glad to contribute what I can to clearing away the haze which, it seems to me, has for years enveloped the discussion of future forests and timber supplies, in relation to the industrial life of America. In the discussions of this in recent years, it seems to me, a number of points have frequently been overlooked and other points of doubtful validity have been sometimes taken for granted.

A mere enumeration of these with a brief and rather abrupt explanation is all that a short space will permit. The future permanent supply of standing timber as a raw material for industry is a problem of economics. How much timber, what kinds of timber, where it should be located, what lands should be timbered, and how the timber should be used, cannot be determined by applying principles of forestry. These questions will be correctly answered only by appeal to the experience of business and industry, in the light of all the complex economic needs of the nation and in consideration of the experiences of other countries under similar circumstances. When the nation's timber needs have been determined—then the principles of forestry correctly applied may show how these needs can best be met.

Whether or not it is good forestry to have forests for the sake of having trees, it is not good economics. Forestry cannot safely construct its own kind of economics without considering the nation's needs for the products of all other industries, which are taken from the same land which might otherwise grow trees, and which are made by the same labor which might otherwise make wood products—and then assert that a program of forest renewal based thereon is a correct interpretation of the public interest.

Fourteen Points to Consider.

To anticipate the probable denial by some reader that the points here commented upon have ever been advocated by any conservationist or by any forester, I wish to say that each one has been advocated to me either in personal conversation or in correspondence. I have never had, however, the impression that the views held by some "conservationists" and some foresters actually represented the views of their respective professions as a body.

1. Possession of cheap and plentiful timber is not necessarily a symptom of national wealth.

The great forests of original timber did and do add greatly to national wealth. But a permanent policy that would perpetuate the original quality of merchantable timber or any large proportion of it might, and probably would, involve a national waste through employing soil, capital and labor for a less profitable use when a more profitable use was available. Low prices for forest products at the expense of relative scarcity and high prices for other commodities is not safe public economy.

2. Removal of original forests from the soil of the United States without provision for forest renewal on most of the land thus cleared is not necessarily a national misfortune.

Classification of land in the light of all the complex agricultural and industrial needs of the nation is basic in any rational plan. The scarcity that is most impressive nowadays is not the scarcity of trees, but the scarcity of trees *near to the centers of lumber consumption*. But although impressive it is not conclusive. It is by no means improbable that a comprehensive survey of the needs of forest industries in the light of all other industrial needs would show that the public interest will best be served if the permanent commercial stands of timber are confined to the mountainous country of the Far West, the Appalachian and White Mountain region, and rough country elsewhere. It might be exceedingly wasteful, for example, to maintain under forest more than a small proportion of the cut-over Southern pine lands. Certainly the ambitious South would resent an effort to maintain the South permanently as an in-

industrial frontier, such as has been its substantial status heretofore.

There is neither reason nor truth in the slogan that: Where a tree is cut another tree should be grown. Such a policy, pursued throughout this land, would entail great waste in the use of the nation's resources. It is the thoughtless cry of those who believe that nature left unaided and undisturbed should be the universal regulator of the economic life of mankind.

3. The fact that old trees are being cut down faster than new trees are growing up does not of itself signify public loss.

It may mean the diverting of some of the productive energies of the nation into more profitable channels than would be offered by the forest industries. The United States is passing through the same evolution of changing lumber requirements experienced by many other countries. During the past 15 years the per capita annual consumption of lumber has declined from more than 500 board feet to approximately 300 board feet, as against 150 feet in Germany immediately before the war, 102 feet in England and 90 feet in France.

4. The virtual disappearance of certain species of timber is not necessarily detrimental to public welfare.

For commercial purposes many species are readily interchangeable. Practically the same things which are now made from a hundred commercial species could be made and the same uses and comforts derived therefrom—from a dozen different species well selected for permanent growth. The elimination from commerce of certain species, provided adequate substitutes are preserved, would involve no necessary impairment of public wealth.

5. Not only is it not *necessarily*, but it is not even *probably* true, that all the lands in the United States better suited for growing trees than for growing anything else, should be used for growing trees.

To use an extreme contrast: If 95 per cent of the land of the United States were better suited for pasture land than for any other purpose would 95 per cent be used for that purpose and we become a nation of herdsmen? Or, if 60 per cent of the area of this country were better suited for growing trees than for agriculture or stockraising, would 60 per cent be so used and the United States then have lumber enough to house five times the number of people it could feed?

But this doctrine is being publicly preached as ideal!

6. The disappearance of forest industries in certain regions because of exhaustion of nearby timber supplies is not necessarily either a local or national misfortune.

Clearing of the land has frequently paved the way for industrial and agricultural expansion which has produced greater wealth than did the forest industries in their prime. It would be a waste of labor, as well as of capital, to attempt to continue an industrial enterprise under conditions which would have returned, as the result of a day's labor, a product worth only \$1,000, when the same labor, and the same amount of capital, under more favorable available conditions of employment would have returned a product worth, say \$2,000.

Surely there is no public economy in making a wasteful use of capital and of human effort. Yet this doctrine is being publicly advocated.

7. Economically the original timber in the United States is in large part a "mine" and not a "crop."

The business of lumber manufacture is no more the business of growing trees than the business of flour milling is the business of growing wheat. Men who buy timber and operate sawmills are not foresters any more than persons who buy coal lands and operate mines are geologists. The business of the lumber manufacturer is to make boards out of trees and if he

does that well he is performing the best public service that his industry can render.

It is not his business to make more trees out of which some one else some day may make more boards. By fortuitous circumstance the lumber manufacturer is likewise usually an owner of land, some or all of which may have greatest ultimate usefulness in reforestation. But this ownership of potential forest land does not put the owner under obligation—moral, social or legal—to undertake the growing of trees when to do so would be unprofitable, any more than the ownership of potential farm land obliges the owner to raise farm crops when he could do so only at a loss.

If the growing of timber is an appropriate private enterprise, which I doubt, the interest of the public (provided it is well informed) in the maintenance of permanent timber supplies will find expression in some form which will result in economic conditions making profitable private enterprise in growing timber. If it is not an appropriate private enterprise the sooner adequate provision is made for doing it as a public enterprise the better. Public agencies would under such conditions experience no difficulty in acquiring from present owners the lands appropriate for use in reforestation.

Public indifference and inactivity cannot, however, encumber the private owner of timber lands with the responsibility for, or expense of, doing something the public should do, but does not.

8. Local shrinkage of employment for labor, caused by vanishing forest industries in certain regions, has been by no means an unmixed evil for labor.

Employment at higher wages has usually been secured by removal to similar industries in other regions, or to other industries in the same region, the higher prices for the products resulting from increasing scarcity of raw material, making the payment of higher wages possible. Temporary dislocation of labor has always accompanied at some stage the industrial use of exhaustible natural resources.

9. The idleness of some of the cut-over timber lands is the inevitable temporary result of clearing the forests from lands upon which maintenance of permanent forest growth would be poor *public* economy. Agriculture, stockraising or other purposes will eventually absorb these lands.

10. The idleness of other of the cut-over timber lands is the inevitable result of clearing the forest from lands upon which regrowing of a new forest would be poor *private* economy.

If the public needs these lands to be reforested before the time when enlightened self-interest—which is the essential driving force of all business and industry—induces the private owner to engage in timber growing, the public should itself engage in reforestation of lands appropriate therefor.

11. The owner of private property in timber lands legally acquired is under no different or greater obligation to use his land permanently to grow timber than the owner of agricultural land is to use the land to grow crops if the growing of crops is unprofitable. The public need for food is at least no less than the need for lumber. Lands on stony hillsides in remote New England are scratched into agricultural productivity which would not be even sniffed at in the more fertile country of the Middle West.

12. The legal obligation upon the owner of property, an obligation that is universal and should be enforced, so to use it as to do no damage to another's property and to do no public injury, does not include an additional

obligation to make a specific positive use of it such as may benefit the public at large although at individual loss to himself.

Failure to reforest cut-over lands is not to do a public injury. On the contrary, *private* reforestation enterprises today on most of the cut-over land would, on the whole, be a public loss because it would involve a relative wasteful use of the nation's resources of labor and capital.

13. If the public is interested in any use of timber lands or of cut-over lands different from that which the enlightened self-interest of the owner may dictate, the public which is the beneficiary should pay the additional cost.

A single class of private property may not be singled out to sustain a burden, in behalf of the public as a whole, which is not imposed upon other classes of private property.

14. The maintenance in idleness of cut-over land is declared to be wasteful.

The larger truth would seem to be that it is wasteful to maintain cut-over land in such state of idleness as does not furnish safeguard against fire and ravage which destroys the natural reproduction of desirable species.

The idleness itself is not always wasteful. In many instances the expenditure of labor upon such land to return it to productive uses is still more wasteful because it withdraws the labor

thus expended from other fields to which it could have been more profitably devoted.

Timber and forest economics cannot be dissociated from the intricate and everchanging economic relations of all industry. But it would seem safe to assume that protection against fire and ravage made universal and uniform among all timber properties, so as to involve no unequal burden upon any competitor, will be adequate to guarantee, by natural replacement, the future of the timber supply at least till such time as the permanent forest needs of the United States, and the most economical way of supplying those needs, can be made more apparent.

A uniform national policy of forest protection and of public acquisition of cut-over lands appropriate for permanent forestation should be adequate and practicable. But the duty of the public should be not confused with the public obligation of private industry. The specific public obligation of the lumber industry is to do well its task of making and selling boards. Along with all others in the nation it shares in the obligation to provide adequate forests for future industry. But this is an obligation common to all and not exclusive upon the lumber industry or upon present owners of its raw material. Being so, the burden of provision for the future should be borne by the public which will profit therefrom, and not by a single industry; lest thereby it undermine the very industry whose future it seeks to safeguard. Economic forces which rule all productive activities will overwhelm a forest policy set up in defiance of them.

MANDATORY CONTROL OPPOSED

BY E. A. STERLING, FOREST ENGINEER

IT seems to me that a discussion of Col. Henry S. Graves' "Principles of Legislation" necessary for the enforcement of a national forest policy is premature and that the fundamentals of the situation should first be clearly established.

In taking this attitude I want to emphasize that the desirability of a sound, national forest policy is fully appreciated, and that whatever is said is in keeping with the request for frank comments and with a sincere desire to assist in developing the subject. The complexity of the problem is also realized, and it is largely for this reason that I believe the first step should be the establishment of basic principles, which are sufficiently sane and obvious to be generally accepted, rather than the creation of arbitrary provisions based on proposed legislative action, which it would be extremely difficult to attain unless it was accepted and approved by all concerned.

While this is in no sense an attempt to outline the fundamentals, I will attempt to summarize below a few of the points which seem pertinent.

1. It is frequently stated, without explanation or figures, that private forest lands must be put under long-time management if an adequate timber supply is to be assured. To carry conviction, and show how much and why this private land is needed, would it not be helpful to develop the following:

(a). The probable lumber consumption at the end of, say 30 and 40 years and thereafter, based on the curve of past consumption in relation to the normal increase in population, and the replacement of wood by substitutes.

(b). The sustained annual output from national forests, beginning, say 30 years hence, when the supply will be much more needed than now.

(c). The prospective future output from state forest lands and from the private lands being operated under definite long-time management.

(d). The forest-producing land needed in addition to the above, to give an adequate sustained output.

The object of working out the points under No. 1 and its subheadings would be to ascertain as definitely as possible the amount of forest-producing private land needed to supplement the ultimate supply from sources now assured. It is a major premise in any proposition to know what is to be accomplished. Having established this, the next step is to find means for its consummation, which it would seem could be worked out progressively as follows:

A. The acquirement by states, as far as they can be persuaded to do so by publicity and legislation, of the cut-over and otherwise unproductive lands, which can be acquired at a reasonable price and reforested with promise of success.

B. The much more limited possibilities in the encouragement of municipal forests by acquirement, reforestation and otherwise.

C. The encouragement of private, long-time forest practice by reasonable tax legislation and co-operative fire protection, wherever feasible. This development has been very slow in the past because of the economic factors which prevent the profitable use of capital in such enterprises, but it is reasonable to expect that market and general economic conditions in this regard will change materially in the next 30 years, and that long-lived corporations, and particularly wood-consuming organizations, will take steps to grow successive forest crops to exactly the extent that it can be made profitable.

D. A continuation and extension of the federal purchase of forest lands, both forested and cut-over, and their inclusion under an established technical and administrative policy.

It is my personal opinion that under the existing political and economic situation a policy aimed at the

mandatory acquirement of private lands will fail; (1) because the public has not been convinced that it is necessary; and (2) for the reason that sufficiently strong opposition would immediately develop to not only defeat such a policy, but to jeopardize any forest policy.

One hears a great deal about the enormous areas of cut-over land more suitable for forest growth than agriculture. If this is the case, is it not a logical step to ascertain the amount and condition of such land and redeem it before taking over the commercial timber, which is to supply the demand for lumber? If the private forest lands are to be reduced to a cut-over condition before the government, by mandatory action or otherwise, steps in and imposes methods and systems which will reproduce such forests, why should we not start with the lands which are in a cut-over condition today? To be sure, the expense of regeneration would be less if the timber was cut more carefully to start with, but if we have some 200,000,000 acres which are practically unproductive at present, is it not the truest kind of conservation to put this into productivity first? At the same time, every possible effort might be made in the way of tax and fire legislation to prevent existing forests from becoming waste when cut over, this probability being helped by increasing lumber and stumpage values.

A suggestion, which I certainly hope will not be misunderstood, concerns the co-operative basis necessary in

developing an acceptable and practical policy. Since private timberland owners are primarily interested in the policy which has been outlined in your "Principles of Legislation," would not the whole matter be better received, and get a fairer hearing if these private owners were consulted and their opinions and co-operation asked, both as timberland owners and as citizens, who have the best interests of the country at heart?

The gulf which has always existed between business interests and the government, it seems to me, could be narrowed in this case if the timber owners were made more fully cognizant of the situation as regards a national timber supply, and the federal and state officials in turn learn of the responsibilities pertaining to the use and returns on capital invested in timber. The government official can wholeheartedly consider the best good of the people as a whole because his check comes regularly from the United States Treasury out of funds supplied by these same people. The business man, on the other hand, may be equally interested in public welfare, but in order to live and to conserve the capital entrusted to his care, must assume responsibilities and follow policies which are often criticized because the critics have an entirely different point of view.

This expression of my personal views is in the spirit of helpfulness and in keeping with the request for a frank discussion.

PUBLICITY EDUCATION NECESSARY

BY R. S. MADDOX, STATE FORESTER OF TENNESSEE

I UNQUALIFIEDLY concur with Colonel Graves' opinion that there must be a strong national policy in order to control adequately the great issues confronting us today.

Colonel Graves has covered the main problems in a very clear and thorough manner. In connection with this big plan I would suggest that in Tennessee and the entire south, publicity education direct from the seat of the Federal Government, co-operating with the States, is necessary in this scheme. Tennessee is not different from many other States in permitting the neglect of her forested lands and timber problems through lack of knowledge. A sure sentiment is growing but it needs co-operation which culminates in action. This result, I believe, will be achieved most rapidly through a systematic co-operative campaign between Federal and State Governments.

Reclamation of waste lands in Tennessee is one of the

big issues in forestry. It is most vital to the State and in addition the results from reclamation projects are more or less rapid and wholly successful. These experiments being carried on in different sections with individual landowners help to make a substantial sentiment for forestry and thus help other forestry problems which we all recognize as of paramount importance. This phase of forestry should be included as a specialty wherever possible in any national policy.

Stimulation of forestry on lands under private ownership as stressed by Colonel Graves cannot be too much emphasized as applied to Tennessee. Here, with the exception of State and Federal owned lands comparatively small in acreage, the holdings are in the hands of individuals and companies. These privately owned lands thus embrace the great bulk of the natural resources and should secure, therefore, direct effective co-operative assistance from the Federal Government.

A LUMBERMAN'S VIEWPOINT

BY EVERITT G. GRIGGS

PRESIDENT, ST. PAUL & TACOMA LUMBER COMPANY

I BELIEVE that a national forest policy should be established by the co-operation of the Forestry Department and practical operators who are continually facing taxation problems and operating costs. So

much theory is advanced in matters of this kind that men who are engaged in the business become disgusted with the plans advanced. It certainly would seem that the history of the lumber business, as it has spread across

the continent, should develop a plan which would protect the future supply of our lumber. It is apparent that very little will be done in conserving a product that has no ultimate value, and the tendency in the past has been to criticise lumbermen and operators for organized efforts to control the product or secure a price for a commodity which is so essential.

Forestry is practiced in foreign countries, where the value of stumpage has reached a point that reproduction can be carried out. Where stumpage is so cheap that the private operator cannot see any investment value, and where the cupidity of the tax gatherer forces sacrificing the timber in order to meet the needs of the community, timber is going to be looked upon as a detriment to the land rather than a benefit.

The State of Washington eliminates speculative values in timber, but sells its lands from time to time to operators who must remove the timber within a definite period, say, one or two years. While this eliminates speculative value in purchasing for future rise, yet it forces on the market the entire tract after it is purchased.

In my judgment, the chief problem confronting the timber owner today is the matter of taxation, and if this

could be properly solved and a man who could afford to hold timber was enabled to retain it until the demand warrants its cutting, a good many of our problems would be disposed of. As it is now the timber pays a tax every year, and an increasing tax, until it is cut off. No more destructive method of timber holdings could be imagined than this system.

It would seem, in view of the fact that there is such a wide divergence of opinion as to the actual standing timber of the country, that the Government, through its Forestry Department, might employ the Aeroplane Service to take views from above of every representative stand of timber in the country, and in this way formulate a policy and an actual determination as to the value of the timber stands throughout the country. There are a good many things that require the backing of Uncle Sam to finance, and I believe the lumbermen generally, at least the progressive ones, will co-operate in every way with the agencies of the Government if the problems that confront them are approached from a practical viewpoint, and not altogether from theoretical or academic stands.

LEASE HOLDS INTERFERE

BY G. L. HUME

VICE-PRESIDENT MONTGOMERY LUMBER COMPANY, SUFFOLK, VIRGINIA

I DO not believe that under the present existing laws and conditions in this section that the proposition for such a National Forest Policy as outlined by U. S. Forester Graves would be practical, especially in the North Carolina pine belt. This is principally due to the

fact that the majority of the timber is held on lease holds, that is, the lumbermen own the timber but not the land. In fact, in only a very small per cent of the cases do the same parties own both the timber and the land in fee.

NO HALF-WAY POLICIES

BY J. E. BARTON, COMMISSIONER OF FORESTRY FOR KENTUCKY

I HAVE read with the keenest interest the address by Colonel H. S. Graves on "The National Lumber and Forest Policy," delivered before the American Lumber Congress at Chicago in April, 1919, and am heartily in support of the remedial measures advocated there. No half-way policies in connection with the establishment of a broad and adequate national and state forest policy will meet the situation. It is necessary to formulate a stiff program and adhere rigidly to it before any progress can be made in legislation which will adequately provide for the perpetuation of our forest resources as a part of the national life of the nation. As has been repeatedly stated, the recent war has certainly demonstrated the weakness and the incompleteness of the policies and programs already in operation. These merely scratch the surface and the broad problem of privately owned timber lands is not touched. There is no reason, with the amount of waste lands at the present time in the individual states and in the United States, that sufficient forest reserves cannot be provided adequately to assure a sufficient supply of timber for the country for an indefinite period, but this is going to be possible only through clear-cut, well

defined and vigorous legislation on the part of the states and the Federal Government, and adequate co-operation among all agencies concerned, in seeing that the details of such legislation are conscientiously carried out. So far as Kentucky itself is concerned, there is already plainly evident that the definite change from large permanently located saw mills, backed by large bodies of timber of sufficient size to warrant the expenditure for large plants to small minor operations, cutting isolated bodies of timber or returning to cut inferior varieties left during the initial operations. The interpretation of this situation means that the virgin stands of timber have disappeared or will be gone in the immediate future. Any program looking to the establishment of a policy which will assure the timber resources of the country indefinitely would involve these features:

- (1) A complete and accurate inventory of the remaining timber resources of the individual states and of the nation.
- (2) Extensive investigations in the matters of yield and growth, upon which, at the present time, there is, over large regions, little or not satisfactory data.

(3) A thorough study of the tax situation, which in large numbers of the states makes not only undesirable, but in most places impossible, the holding of the timber land by private individuals with the view to maintain such lands in forest crops. Forest taxation laws, so far as feasible, should be uniform throughout the states, and certainly throughout definite timber regions, so the same advantages may accrue to all individuals throughout the region, and certainly throughout the individual states.

(4) A very definite plan for the purchase of lands by the states to be retained as a nucleus for extensive state forests in the future, such purchases to be backed by adequate appropriations.

(5) Increase in appropriations on the part of the Federal Government for co-operation with the states under the Weeks Law, looking to adequate fire protection to the forests within the state boundaries.

(6) Increased purchases on the part of the government in the eastern part of the United States particularly of lands for national forests.

(7) Rigid legislation in regard to the cutting of timber, brush disposal, replanting areas suitable for timber crops and other measures necessary to the perpetuation of the forests of the nation.

(8) Regulation of the disposal of timber more in accordance with the law of supply and demand, and less in accordance with the exigencies of local conditions induced by taxation and other features.

The question of freight rates and transportation loom large in the present problem. And such matters as organization within the trade to avoid waste, effective marketing both at home and abroad and to avoid overcutting of present available supplies demand nation-wide study and concerted effort of all interest involved.

A FOREST POLICY BADLY NEEDED

BY ELLWOOD WILSON. PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

A DISCUSSION of the proposals of U. S. Forester Henry S. Graves for a national forest policy is most appropriate.

The time has certainly arrived when the exploitation of forest lands must cease and they must be managed for sustained yield. The cutting over of timber lands, leaving them in an unproductive state, cannot be allowed to continue. The theory that a man can do what he likes with his own property, unless his use of it damages his neighbor or the public welfare must be applied to private owners of timber. The speculative purchase of virgin timber lands, the rush to cut and market the cut, denuding the lands and overstocking the markets, may have made a few timber "barons" but has in no sense been a benefit to the country at large. The time has now come when we must imitate the countries of Europe which have passed through the same crisis.

Whether Colonel Graves' program is just the right one or not is not certain, but the idea of regulation is absolutely right. The timber lands of the country must be kept productive and those lands which are suitable only for tree growth must be made productive. It is a

question whether the mere regulation of cutting will make such lands productive, probably in many cases artificial regeneration must be resorted to, but in any case the country at large must take the question up and find a solution for it. The most satisfactory plan would be for the holders of timber to realize the situation and by consultation with foresters initiate steps to perpetuate their timber, thus acting not only in their own interest but in that of the country at large.

It would seem that the whole matter was one of education and that an intensive propaganda should be commenced and carried on. One very good way of bringing home to lumbermen the necessity for better methods is through the banks which advance them money and who hold their bonds and other securities. Boards of trade are also interested, also rotary clubs. Newspapers of course should be reached, especially in localities where timber lands are situated. School children should be reached not only because they are future citizens, but because they often educate their parents. Other methods will readily suggest themselves to those with experience in such work.

TERMS USED IN FARM FORESTRY

THE increased interest in the subject of private forestry, particularly with reference to farm forestry, has brought about the general acceptance of the term "woodland" or "woods" instead of the original one of "woodlot."

A large proportion of the woodland in the eastern United States is in irregularly shaped tracts, spreading out over ridges, ravines, slopes, swamps and poor lands, whereas "woodlot" carries the idea of a small sized, regularly shaped, and, in a large section of the country, fenced tract. When applied to the large or irregularly shaped tracts, it is obvious that the word inadequately describes the conditions. "Woodlot" probably originated in New England and seems fairly well established there.

So long as only conditions like those in New England were considered, "woodlot" was accepted as adequate, but in the last few years farm forestry has been developing rapidly throughout the country. The private forestry movement is of tremendous importance not only to the owner of woodland, but to the whole community in which he lives or in which the timber occurs. It is extremely desirable that the success of the movement should not be hindered by the use in forestry literature of a term which does not fit the conditions.

"Woodland" and "woods" are more satisfactory, more expressive, and avoid the possibility of creating confusion in the minds of the people over most sections of the country where the word "woodlot" has never been in local use.

THE USES OF WOOD

FLOORS MADE OF WOOD

BY HU MAXWELL

Editor's Note:—This is the fourteenth story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

IN some respects and for some kinds of floors wood has no equal. It is attractive in appearance, agreeable to the touch, contains low heat-conducting properties, is nearly impervious to water, and the degree of hardness or softness desired may be secured in a measure by careful selection of the wood. Wide choice of color is possible. The material is easy to cut and work, is fairly light, strong enough to meet most of the demands likely to be made upon it, sufficiently hard to offer necessary resistance, and its cheapness places it within the means of those who need floors.

The range of choice as to cost, figure, hardness, color, and durability is extensive. When all of these factors are considered, wood is found to head the list of floor materials in this country. If it does not occupy that position in

some other countries, it is due to scarcity there. Wherever wood can be had at a reasonable cost, and in adequate quantity, and of suitable kinds, it holds first

place as stock of which floors are made. The principal argument against it is its tendency to burn readily. Its use is somewhat limited by fire laws in towns and cities.

It has been many times demonstrated that properly laid wooden block floors resist fire in a remarkable manner. In the Baltimore fire, pavement of such blocks, exactly similar to those laid in floors, passed with little injury through the conflagration. It has been noted, likewise, that the overturning of cauldrons of molten metal in foundries, where floors of such blocks are in use, do less injury to the floors than would be expected. The blocks, under such circum-



DOUGLAS FIR FOR FLOORING

The most important flooring material in the region west of the Rocky Mountains is Douglas fir. It does not measure with some of the eastern flooring woods in hardness, but it is moderately hard and it is so abundant that it has no rival in the western part of the United States, and it also finds its way to eastern states.

stances, burn with such extreme slowness that the floor is not usually put out of use.

Wooden floors formed parts of some very ancient buildings. Occasionally the floors and roofs were of wood while other material formed the walls. Traces of wooden floors are found in some of the prehistoric stone buildings which are supposed to have been erected by ancestors of Indian tribes of New Mexico and Arizona. Such floors may have been only poles and small logs closely fitted together, or two or more layers crossing at right angles; but the floor was an essential part of the architect's plan and of the builder's work.

The evolution of the wooden floor has been interesting and its history long. The neolithic man may have

floored his camp with brush cut with a stone knife and spread over the snow or the wet sand to keep his feet out of the water or off of the ice. No records of such have come down from the stone age, but they doubtless existed. Be that as it may, miners in Alaska make brush floors yet to hold their feet above the snow, water, and slush when they pitch their tents for the night's camp during their cross-country expeditions. After packing a heavy load on his shoulders all day, or driving a team of huskies, the traveler in the far northern country selects his night's camping place, and one of the first things he does to make his camp ready is to cut spruce brush, spread the branches for a floor, start a fire in his sheetiron stove, and then remove his boots to give his tired feet a rest. The branches keep his feet dry though

snow or water may cover the ground beneath. Thus, what was probably the oldest pattern of wooden floor in the world is still in use, having undergone no change since the days of pleistocene men who hunted the saber toothed tiger in California and the hairy elephant in Siberia.

The American pioneers floored their cabins with wood before they had sawmills for cutting lumber. Most of the earliest huts in the forest had puncheon floors, if they had any except the ground, for dirt floors were not

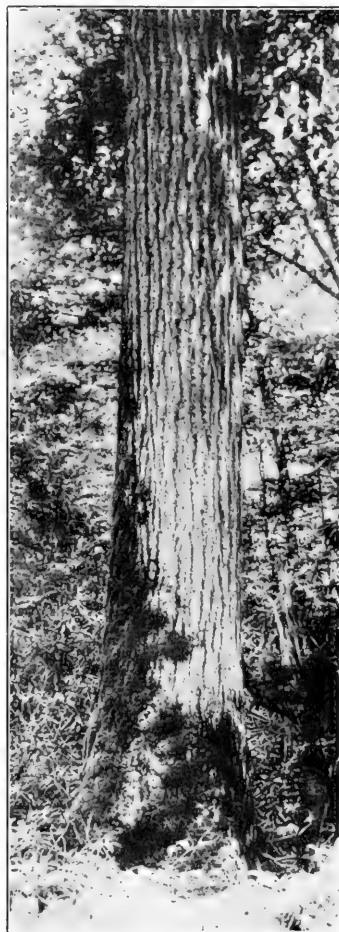
then uncommon and they were used when wood was abundant. The surface of the ground was smoothed, tramped hard, and it was frequently the only floor the cabin knew. Rural politicians of early days sometimes liked to parade the information that they were "raised in a cabin with a dirt floor." They seemed to imagine that it was a credit to them, while, as a matter of fact, it was an admission and confession of ordinary laziness, because no man had any excuse for living very long in a cabin with a dirt floor in those times and places of abundant timber.

Puncheon floors were common. They were made of split logs, flat sides up, and smoothed with ax or adz, and fitted edge to edge. In the California redwood country, houses somewhat pretentious in dimensions were often floored with split



PACIFIC COAST MAPLE

Most maple flooring is cut east of the Mississippi river and north of the Ohio. It comes from the common sugar tree, generally known as hard maple. Some maple flooring is cut on the Pacific Coast from the Oregon maple. It is not abundant but the flooring is generally satisfactory. It is not quite so hard as the eastern maple.

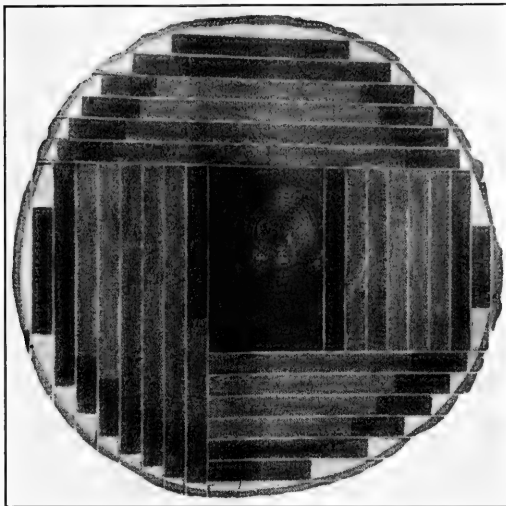


RED OAK FLOORING MATERIAL

Manufacturers of flooring find much excellent material for their output in the mature trunks of northern red oaks. This wood is not usually as highly figured as the white oak, but it is naturally higher in color and that may offset any deficiency in the figures of the quartered wood. It is frequently well figured.

puncheons, not only the first stories, but the second as well. Redwood splits so perfectly that puncheons a foot or more wide and two or three inches thick can be rived in shape nearly as perfect as sawed lumber. In eastern hardwood regions, during the years when split floors were being made, the finest flooring puncheons were of ash, because of the facility with which that wood splits. Chestnut and oak were also favorite puncheon timber. Split boards suitable for floors were often made into doors for the cabins, when sawed stock was not convenient. Those who wanted something a little better than split puncheons for floors, and could not procure lumber from a saw-mill, had recourse to the output of the whipsaw operated by hand power. Floors and doors were the first places in cabin building to be filled by sawed lumber. When it became more plentiful, the entire cabin was built of it, but that was not the case at first.

It remains true, however, that floors conforming to civilized standards were not common till sawed lumber became available. The older and ruder wooden floors were really makeshifts. Nevertheless, even when after sawed lumber was to be had, some preferred to adhere to the old puncheon size in providing flooring lumber, that is, they wanted planks as large as could be had, and sometimes they were much thicker than necessary. Floors strong enough for factories were put in residences. At the present time, flooring lumber is preferred in strips from two to four inches



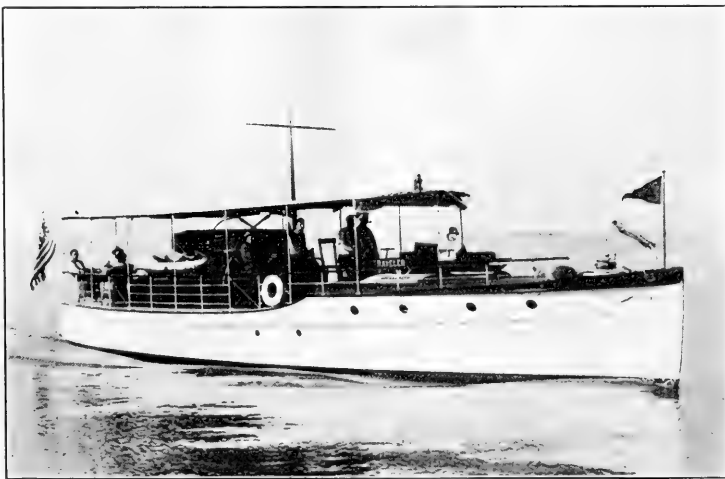
METHODS OF SAWING FLOORING

Flat grain, edge grain and quarter-sawed stuff all come from the same log. The name given the stock depends upon the manner in which the boards are cut. Any wood may be quarter-sawed, but better results are obtained from oak than from most others, because the quartered grain in oak is more easily seen.

of weather. Such behavior did not seem to be regarded as a very serious matter then. An old house in Pike County, Pennsylvania, was torn down after the pitch pine floors had served 160 years and were still serviceable, and the size of the flooring planks amazed the modern mill-men who saw them. The planks were two feet wide and an inch and a quarter thick. Such a floor would be out of fashion now, though when the old Pike County house was built, the wide pine flooring planks doubtless excited the admiration of all who saw them.

The length of service to their credit is proof of the excellent wearing qualities of the northern pitch pine, a wood which deserves a better reputation than has been accorded it.

Most modern floors are made of woods moderately hard. No such custom was strictly adhered to in former times. In the white



FLOORING ON SEA AS WELL AS ON LAND

A large bill of lumber is required annually to floor the better class of boats, for all flooring is not destined to remain on land. Some of the handsomest floors to be seen anywhere are put in vessels, and wood gives as good service there as in any other situation.

pine country many floors were made of that extremely soft material. It was a favorite wherever it was known. It was convenient, cheap, and it worked easily. A similar custom prevailed in far western regions in regard to redwood and sugar pine. Convenience, in

ing. The chief purpose of all is to provide a floor that is practically waterproof, dust proof, airtight, and which will remain solid and presentable under heavy wear and for a long time.

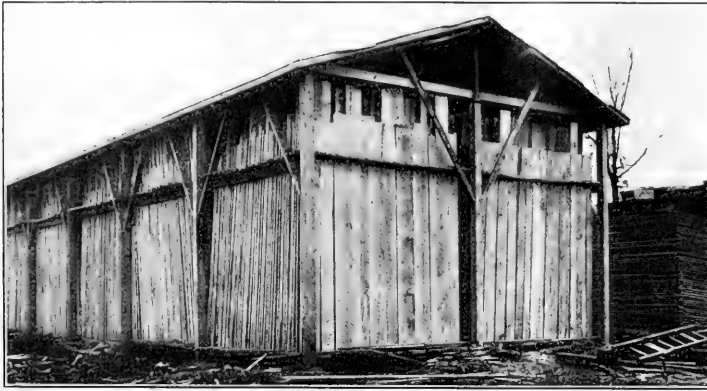
Some floors are laid double, the lower being known as the sub-floor, while the upper layer forms the visible finish. The sub-floor is not seen under ordinary circumstances, and the lumber in its construction need not be selected with a view to its appearance. It is not subject to direct wear and for that reason the wood is not required to be hard, though it must be strong enough to safely carry all the load placed on it. Such is really a two-ply floor, and the boards of the two plies generally cross each other at right angles, or obliquely. The top layer is for show as well as for service, and in most instances a fine hardwood is selected, one that looks well and wears long. This floor

may consist of narrow strips matched side by side and end to end, and perhaps of less than half an inch in thickness. It is not necessary to use thick lumber for this top floor because it is supported by the sub-floor, which carries the load. The principal advantage in using thin lumber for the upper floor is that it effects a saving of valuable wood. The thin shell is sufficient.

many instances, counted for more than the length of service that might be expected when the wood was laid in floors. Even a floor of white pine would last several years, and builders seldom looked farther ahead than that.

Clear white pine is quite soft and as floors it wears rapidly if subjected to much use; but the knots are hard and wear slowly. Consequently, white pine floors become very uneven after a few years. Every knot becomes a high place and the clear wood between wears away, leaving valleys between the knots. Hardwood floors wear more regularly. With them less difference in hardness exists between the knots and the clear wood.

The usual kind of modern floor is known as tongued and grooved, or it may be known as matched. Such has been in use hundreds of years, but there are different sorts of tongues and grooves. Generally the tongue is cut in one edge of the flooring piece, the groove in the other, and these pieces fit edge to edge. Sometimes both edges are grooved and a flat dowel, made as a separate piece, fits in both and serves as a tongue for both. The Egyptians seem to have been acquainted with that method of joinery, so it dates back a long time. Carpenters and planing mill operators have exercised their ingenuity in devising and laying new kinds of floor-



ROUGH FLOORING STOCK

Seasoning is one of the first and most important processes through which flooring is passed in its preparation for the planing mill. It may be dried in kilns in a few days, or it may receive its seasoning in the air. That process takes longer but the seasoning by air is always popular.



BLOCK FLOOR IN LARGE FACTORY

The floor shown in the above illustration is made of redwood blocks of 4x6 inches surface and a depth of two and a half inches. It is doing service in a shipbuilding plant on the Pacific Coast. Such blocks have become popular in certain kinds of plants where wear is heavy and the elements of decay are active

Manufacturers and users of flooring lumber make much use of the term "grain." That word is common with most people who deal with dressed and finished lumber. The term is not understood in the same way by all people who employ it, but the flooring people give

it a precise and definite meaning. Flat grain and edge grain are the most common terms. The former is applied to lumber sawed tangentially, that is, off the side of the log in the same way that the slab is taken off. Edge grain flooring is cut radially; that means, the saw is set to cut from the sap to the heart. The same method is known as "quarter-sawing." When the sawing is done from the sap to the heart, the edges of the annual growth rings are exposed to view in the flat surface of the flooring strips, hence the name, edge grain. In this instance, "grain" is synonymous with annual ring. When an edge grain floor has been laid and is ready for use, the exposed surface, that which takes the wear, shows the edges and not the flat sides of the

growth rings. These rings may be visible in the floor as one walks across it. At any rate, they may usually be seen if a careful examination is made. Such is not the case if the floor is laid of flat grain lumber. It presents a different appearance.

One kind may be preferred in one situation, another in another. It is partly a matter of taste, partly a matter of utility. Edge grain flooring is stronger, harder, and wears better, according to claims of some; but this claim is at times open to question. The kind of wood and the rate of growth have something to do with the appearance of the floor. The question as to which is the best is still unsettled, but if one kind were unquestionably better than the other, the public would long ago have found it out, and the best kind would be in use to the exclusion of the other.

Floors of parquetry are built of blocks, strips, and borders. They should not be confused with the block floors which are popular in factories. Those of parquetry are in the best class and may be quite expensive. It would not be wholly inappropriate to call them "wooden tile" floors, because in pattern they resemble tile. Woods of different and contrasting colors are selected, because beauty is the object sought in such a floor, and it is produced by contrasts and harmony. Nothing would be gained if all component parts of such a floor were alike in color.

The woods may have colors imparted to them by artificial means, by employing stains and dyes. As white a wood as holly may become a substitute for as black a wood as ebony; birch may take the place of red mahogany; and yellow poplar may answer for woods of deep



(Courtesy Maple Flooring Manufacturers Ass'n)
THE GROWTH OF CENTURIES

A long, large trunk, clear of branches, is a guarantee of age and maturity in maple, and it is from such trunks that the highest class of flooring stock is procured. Trees which will cut a thousand feet of good maple flooring are above the average, though an occasional tree overruns that figure.



(Courtesy Maple Flooring Manufacturers Ass'n)

A BEAUTIFUL BEECH

In the forest this tree often attains a height of 120 to 140 feet, with smoothly rounded bole as symmetrical as the pillar of a cathedral. The bark is light gray. The wood is close-grained, hard and strong and excellent for use as flooring.

colors; but it is better to use woods which naturally have the desired colors, because stains and dyes may not penetrate much beneath the surface and after a little wearing down by use, the real tones of the woods may appear and betray the counterfeit.

Floors of parquetry may be built in place, block by block, strip by strip, and border by border; or they may be made in factories, the pieces all matched ready for laying in sections. One style of such flooring is called wood carpet, though it is more properly a floor-covering than the floor itself, and that is what is implied when the name carpet is used.

Some floors are not meant to resist much wear. Quite soft woods answer for such. Floors of that sort are oftenest seen in large store windows intended for show, and in alcoves and on balconies where merchandise is displayed and few persons ever walk, except window trimmers, decorators and janitors. Very soft woods like white pine and basswood will stand all the wear to which they are commonly liable in such situations.

Factory and warehouse floors are of a wholly different kind. They must stand rough usage, and the wear is often excessive. Heavy trucks and barrows trundle over them, and the surface of the boards, if the floors are of lumber, are apt to be splintered by the grinding and crushing action of wheels, or splintered or dented by the fall of heavy bodies. This holds true of warehouses in particular, the

floors of which must be strong. To secure this condition, sometimes the sub-floor is made of planks several inches thick, and over this is laid a thinner floor of hardwood to receive the immediate wear. By that arrangement, the surface is kept fairly smooth. In many instances, the flooring in a factory or a warehouse is of edge grain lumber, such being less liable than plain planks to split and splinter under rough usage.

Another kind of flooring common in factories, mills, breweries, tanneries, and stables, is made of blocks, set in a way to expose the end grain to wear. These blocks are similar to those used in paving streets. It is customary to set such blocks on a plank floor as a foundation, and after the blocks are in place, they are treated with a dressing of tar, pitch, sand, asphalt, or some similar material. This fills the interspaces between the blocks and makes the floor solid and tight.

The end-grain of the blocks forms the surface of the floor. It wears better than the side of the block, because the ends of the wood fibers bruise slightly, forming a com-

compact, felt-like mass, resembling a cushion, and this resists wear in a remarkable manner, and at the same time it is sufficiently soft to deaden and neutralize the jolts and jars caused by passing trucks or by the dropping of heavy objects. It is a yielding and semi-noiseless floor, and for that reason it is popular for certain kinds of buildings. The employment of wooden blocks as flooring



SOUTHERN TIMBER FOR FLOORING

Flooring is made in the South as well as in the North, and each kind has a field to fill. The above picture represents a forest scene in Georgia where trees of different kinds grow intermingled, and among them are some possessing great value as flooring stuff. Softwoods and hardwoods grow side by side.

material is rapidly extending. Many factory floors are constantly damp, which condition is due to the nature of the business carried on. Under such circumstances, decay is liable to attack wood.

The usual combination of warmth and dampness conduces to speedy decay, unless measures are taken to counteract it. Such measures are well understood and are within easy reach. They consist of preservative treatment with certain chemicals, creosote among others, which retard the development of decay and prolong the floor's period of usefulness. This treatment is possible with all wooden floors, but is oftenest met with in those made of blocks set on end. The preservative treatment is applied to the wood before it is laid in the floor. Wood kept always dry has no occasion to be given treatment to hinder decay, since dry wood does not rot. Some woods in their natural state resist decay much better than others, when they are employed as flooring blocks, and with some of them the application of preservatives may be dispensed with. Usually woods of deep color in their natural state are less subject to decay than are those of light color, but this is not a universal rule. Among woods which in their natural state resist decay well are walnut, locust, redwood, osage orange, cypress, heart yellow pine, catalpa, mulberry, mesquite, and red cedar. These are suitable for flooring blocks for warehouses and factories where the causes of decay are active. Other woods may last a long time if given the proper preservative treatment.

All kinds of commercial woods are occasionally employed as flooring. None is so soft that it cannot fill certain places; none so hard that it is universally rejected. Those as white as balm of gilead and holly fill certain places in this industry, as also do those as dark as ebony and dialamban. Those light of weight, like arborvitæ and white pine, are acceptable as floor material, and no less so are the heavy woods like lignum-vitæ and salmon gum.

It is not possible to quote precise statistics to show the kinds of wood made into flooring and the annual output of each. Statistics have not been kept in a way to show this. Figures relating to flooring production, compiled by the government, include certain other products, and the totals only are given, the separate items not being presented. Tables which contain figures on flooring, contain also such items as siding, ceiling, doors, sash, blinds, and frames for windows and doors, all thoroughly mixed in the totals, and it is now impracticable to separate them.

It is safe to conclude that the leading floor woods are yellow pine, Douglas fir, oak, hard maple, and hemlock. Probably half of all the flooring cut in America is made from the five here named. But the list of flooring woods

does not end there. Birch, yellow poplar, beech, chestnut, cypress, gum, and many more meet a large demand. Each possesses qualities which give it value.

Maple is very hard, takes a smooth finish, has no figure except the birdseye of an occasional tree. It is among the whitest of our woods. Its strength rates very high, and its stiffness is excelled by few woods of this country. Eight species of maple occur in the United States, and probably every one is made into flooring except the vine maple, which is too small; but only one of the maples is prominent as flooring material. It is the hard maple of commerce. The silver maple (often called soft maple) is probably second among the maples as wood for floors.

Most of the fifty-odd oaks in the United States might be made into flooring and many of them are so utilized; but most oak flooring is of white oak, of which there are several important species. Oak falls below maple in hardness, stiffness, and strength; but it ranks high in these three qualities, and in addition, it is always more or less figured, and many persons use it because of the figure, particularly when quarter sawed. The red oaks are good stuff, but their color is not quite so satisfactory as that of white oaks.

Birch flooring is in a class with sugar maple in hardness, stiffness, and strength, and two species, yellow and sweet birch, supply most that goes to market. Beech floors have never been quite so popular as maple and birch, but beech is an excellent wood, very hard, stiff, and strong, and its tendency to wear smooth makes it popular for dancing floors. In damp situations it stands more wear than other woods, and this makes it desirable for factory floors.

The leading pine flooring is manufactured from southern long-leaf pine, which is hard, strong, and it is often figured by growth rings. Douglas fir, from the region west of the Rocky Mountains, is now much used for flooring, and it measures about with long-leaf pine.

Red, black, and cotton gums are employed in warehouses and factory floors where heavy planks are used. These woods are tough and last well under truck wheels and in other situations where rough usage is met.

Block floors are of pine, fir, and redwood principally, but many other woods contribute.

Perhaps six billion feet of wood are yearly worked into floors of various kinds in this country. This total is based on estimates and does not represent exact figures; nor does the total include the sills, joists, and other supporting and supplementary timbers which sustain the floors. The relative amounts of hardwoods and softwoods are difficult to estimate; but probably softwoods are more than half, the leading softwoods being yellow pine, fir, and hemlock, and the principal hardwoods oak, maple, beech, and birch.

EROSION IN THE APPALACHIAN AND PIEDMONT REGIONS

BY R. O. E. DAVIS

THROUGHOUT the South Atlantic States the excessive erosion of the soil is probably more marked than in any other section of the country. The results of this excessive erosion are worst in the Piedmont section of the coast states. There are many factors influencing the rate of erosion, but the character of the soil causes a marked difference in the rates of erosion under the same conditions.

The heavy clay soil of the region erode fairly rapidly developing the shoestring type of gully with rounded edges. Where soils somewhat lighter with a higher percentage of sand particles in them are encountered, the type of erosion is that of the gully with vertical sides, or the caving gully type. Differences in the soil and subsoil influence profoundly the character of erosion. Silty soils or clayey soils with subsoils of a sandy character exhibit the most rapid and most difficult controlled erosions.

The regions of the South subject to excessive erosion are in a number of soil provinces, but the greatest amount of eroded soil occurs within the Appalachian and Piedmont regions. It is in the Piedmont Plateau, near the "Fall line," that the greatest difficulty is experienced in dealing with erosion. The Fall line forms the boundary between the Appalachian and Piedmont provinces and it is here that the rapids occur in the various streams in their course from the mountains to sea.

The soils of the entire section are mainly residual, *i. e.*, derived from the underlying rock and in general the topography of the region conforms to the structural character of the underlying layers. While erosion has affected the relation between the surface form and rock configuration locally, especially in the southern portion of

the region, the main ridges correspond with the position and the prevailing northeast and southwest direction of the more resistant rocks.

In localities where the surface is smooth the soils lie directly over the rock from which they are derived, but on slopes a considerable movement to lower levels has taken place mainly through the action of water. Outcrop of rock is frequent, but by far the larger part of the area is covered with a soil mantle of sufficient depth for the support of forests. Much of it is so steep that it is not

suitable for cultivation, and is best adapted to forests, grazing or small fruit production. The principal soils are the loams, clay loams, silt loams, sandy loams, clays, fine sandy loams and stony loams.

In the southern Appalachian region the forests on the hill and mountain sides have maintained an open and porous soil; kept in this condition by the covering of leaves and debris of



CLEAR AND STRIKING EVIDENCE OF WHAT EROSION WILL DO

A gully in the lowlands has gradually eaten its way back into the hill of this Georgia pine forest. Each rain adds to the length and breadth of the gulch.

the forest. The rains falling on the forest floor never reach the soil with unbroken force, so that the finer soil particles are not pounded and stirred and carried off in the water which flows over the surface. The velocity of the moving water is so reduced that where the forest covering is intact erosion is almost a negligible quantity. Where this rate of erosion is slow there has been established gradually a state of equilibrium between the slopes and rainfall. This slope remains practically constant for very long periods if the conditions are not changed. There is a slow movement of material, but this is not sufficient to disturb the general contour or to injure the vegetal covering. Only occasional cloud-bursts or exceedingly heavy rains produce a visible effect on the soil surface conditions.

It is true throughout the Appalachian region that the streams which flow from the wooded mountains carry very little sediment. Even the cases in which such streams appear turbid, much of the suspended matter is of organic origin. It is also characteristic of such streams that they rise more slowly after a storm, remain in flood for a longer period of time, and fall more slowly than similar streams in non-wooded areas. The Geological Survey has pointed out the characteristics of such streams in the Appalachian region of North Carolina and Tennessee. Cane River from Mount Mitchel and streams in the Lake Toxaway section never become muddy, although often greatly swollen from continued rains. These streams are in equilibrium with the land through which they flow. This equilibrium will be disturbed only by clearing the land, which causes a change in the relation of surface slope to stream gradient.

It is not uncommon to find the contrast to this condition in localities where the forest has been depleted either partly or completely by lumbermen. Often in the snagging of logs the trenches formed furnish drains down which the accumulated water rushes with great velocity. It is the work of a very short time to cut these trenches into gullies which often devastate



THE SACRIFICE OF THE TREES

A small wash too long neglected in a soil especially susceptible to erosion has resulted in a gulch which even the fine forest of Georgia pine cannot stop. With every storm some mighty tree becomes a sacrifice to the appetite of this voracious monster.

guard to the later effects on the land recently divested of its forest covering.

In the Piedmont section the more devastating effects from erosion occur because this land is not too steep for

cultivation and there has been extensive clearing of the land. The soils are of the same origin and very similar to the soils of the Appalachian region proper, so that from the results apparent in one region can be determined largely what will be the outcome of extensive clearing in the other.

The type of soil has a great influence on the rapidity with which bad effects from erosion become



THE GULCH APPROACHES—THREATENING DESTRUCTION

The removal of the forest covering has resulted in the formation of a gulch which has already forced its way across the road and is threatening to swallow up this farmhouse.

evident. It is possible on some types of soil, most notably the heavier clays, to cultivate on rather steep hillsides without serious damage from erosion. But even here continual vigilance is necessary to avoid the ultimate ruin of the land. On soils of a lighter character, or loamy condition, erosion is very destructive if once the land becomes gullied. On the other hand, soil of an open, porous nature is easily dealt with if the proper precautions are maintained to stop any indication of surface washing.

The fact that stream flow is greatly influenced by the presence of forests is so well known that it is almost trite to refer to it. However, when we consider the enormous damages each year from floods, as well as the cost of continual dredging of streams to maintain open channels for navigation, it becomes imperative that the forests' influence be emphasized. As already pointed out, many of the Appalachian streams rising in the mountain

show that floods are increasing in frequency and height. The evidence collected in this region shows that the Kiskimmitas and Youghiogheny rivers are the most important rivers in producing floods at Pittsburgh. The two streams drain extensively deforested areas of about the same size, with heavy precipitation and a high rate of run-off. In consequence of this deforestation both rivers collect and move their floodwaters to Pittsburgh in about the same time. This is but one of the worst instances where removal of the forest covering results in disaster to the low lying country.

Much of the erosion in forest is started by careless handling of logs. Under conditions where excessive erosion would not take place if care were exercised in handling cut timbers, the "snaking" and dragging of logs result in the formation of smooth depressions into which water gathers and drains from the steep hills. The



THE DEVASTATING RESULT OF EROSION

A one-time fertile valley in Tennessee ruined by a covering of sand brought down from the nearby hills, deprived of thin forests and subjected to erosion

forests are clear and free from sediment; but many, and they are fed invariably from watersheds, in part, at least, cleared of their forests, carry a heavy burden of sediment.

The Flood Commission of Pittsburgh appointed to investigate the cause of floods at Pittsburgh and to recommend means of removing the danger, reported that extensive deforestation of the drainage areas of the Allegheny and Monongahela Rivers by giving a higher rate of run-off, has been the cause, in part, of the increase in frequency and height of floods along these and the Ohio rivers. It is furthermore well known that the carrying capacity of the river channels at Pittsburgh has been considerably reduced in the last fifty years. The records

rapid cutting of these depressions quickly results in the formation of gullies which advance into sections otherwise not susceptible to erosion.

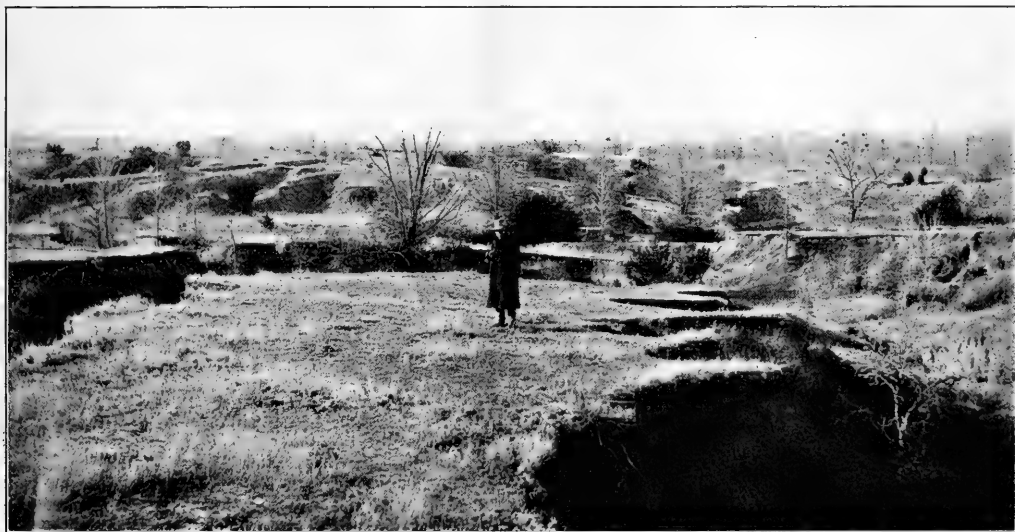
The peculiar climatic and soil conditions of the Southern Appalachian region, especially, are conducive to the development of gullies. In some localities erosion started in the manner described continues to work its way back into the hills, constantly increasing in depth and width the eroded section with numerous gullies starting from the sides, until immense areas are devastated and the gullies formed almost defy the ingenuity of man to check their progress.

The removal of vegetable covering from the hills has resulted in a largely increased burden of solid material

in the rivers. This sediment is carried to the lower lying regions and much of it is deposited in the stream beds. The river channels become so filled that navigation is greatly hindered, or constant dredging must be resorted to. In addition, where storage reservoirs have been built by constructing dams, the sediment is deposited in the reservoirs and reduces their capacities. In fact, in some places it has been found inadvisable to try to maintain storage reservoirs, and the practice has been adopted simply of keeping open a channel. This results, of course, in the loss of much power. One of the power experts employed in developing the power from some of the streams in the South, testified before the Agricultural Committee of the House of Representatives a few years ago that the capacity of certain reservoirs was so much reduced that in a few years only the flow of the rivers

being farmed began to erode. But with increased value of lands the necessity of utilizing that already cleared becomes constantly more and more impelling.

Reclamation is of two classes; lands reclaimed for cultivation and those for forests. The same methods that are used in prevention must be used in reclamation. Where lands are reclaimed for purposes of cultivation, methods are adopted to increase the porosity of the soil, thereby assuring the ready absorption of water, and to retard the velocity of water not absorbed and flowing over the surface of the soil. The incorporation of organic matters in the soil, the growth of deep rooted crops, green manuring, sodding to pasture, deep plowing, the use of various forms of terraces and hillside ditches are some of the more common methods employed to prevent erosion and to reclaim eroded soils.



LAND RUINED FOR AGRICULTURE BY GULLYING

A deforested area near the Tennessee-Mississippi line which has resulted in the formation of numerous gullies and has ruined the land for agricultural purposes.

would be available for power. A report from the Geological Survey on the amount of silt carried by some of these rivers, states that the Susquehanna carries to the sea, annually, 240,000 tons, the Roanoke, 3,000,000 tons, the Alabama, 3,039,000 tons, the Savannah, 1,000,000 and the Tennessee, 11,000,00 tons. It is but reasonable to assume that at least half of this wastage of soil material is preventable.

In discussing reclamation it is well to remark that it is infinitely better to practice prevention than to apply reclamation. However, there is no denying the fact that the damage has been wrought in many places, and methods of reclaiming the devastated areas must be considered. In the past, with cheap land, it has been easier and less expensive to move to new lands, when those

The forests have been removed from some soils that should never have been deprived of their natural growth. In such sections the devastation has been almost unbelievable and the only feasible method of utilizing in any way these lands is by reforestation. The type and kind of trees best suited for the work must be determined for the individual localities.

From inquiry and personal inspection of the worst eroded sections of the Appalachian region, it has been found that practically all of the lands now useless can be utilized by reforestation. The benefits of such a course can hardly be exaggerated. The losses entailed in manufactures, power development, navigation, and flood conditions now amounting to millions yearly, will be greatly reduced if not largely eliminated.

WHY AND HOW SOME FOREST FIRES OCCUR

THE tremendous forest fires which swept the forests of the northwest during July and August, costing millions of dollars to fight and causing damages amounting to many millions of dollars more were due to what?

This interesting question is well answered in a letter dated August 2, to AMERICAN FORESTRY, by R. H. Rutledge, acting district forester of District No. 1, which includes the national forest area of northern Idaho and Montana. The fires were due to a dry year, the third in succession. Lightning, railroads, campers and brush burning started most of the 909 discovered on this forest area in July. Almost one-fourth were due to unknown causes, and twenty-seven were incendiary.

A terrific thunderstorm on July 31 resulted in fifty fires being started by lightning.

"This is the third dry year in succession for District

1," says Forester Rutledge. "The snowfall last winter was far below normal and in many localities spring precipitation was insufficient, many places having been without rain for over three months. High winds have prevailed quite generally for some sixty days and the atmosphere has been charged with electricity to such an extent that dry electrical storms have been constantly occurring. As a result the forest floor is as dry as a powder-house and because of excessive transpiration the leaves of coniferous trees have become so combustible as to be almost explosive when subject to ignition.

"While human agencies have been responsible for some of the fires this season, lightning has been by far the most prolific source of trouble. Dry electrical storms have started a great many fires in the most inaccessible parts of the forests where it has been impossible to get men and equipment on the ground quickly. In numerous



FIG. 1. PICTURES SHOWING TREE STRUCK BY LIGHTNING AND ITS SPEEDY DESTRUCTION.

The first picture shows a tall, slender evergreen tree in the Selway National forest, struck by lightning. The lightning struck at point indicated, followed down tree to a large limb on right hand side of tree at upper edge of flame showing in picture. At that point it entered body of tree, followed down trunk, splitting it vertically through but did not break it off. It or 15 or 16 feet below it struck again, and continued down on outside of tree to ground in 3 distinct paths. Smoke was seen coming out of the split portion of tree shortly after bolt struck.

The second picture shows the split portion of the tree more thoroughly burned, and at one point will be observed a hole burned through the tree. The tree fell, completely destroyed by fire, twenty-four hours after it was struck. There now remains only a blackened fire scarred trunk 20 feet high. Picture presented by Supervisor Fenn, of the Selway National Forest, Montana.

cases it has required from three to six days for fire fighters to reach a fire from the nearest railway point. And when it is remembered that equipment and supplies for the men must be transported on pack horses over rough mountain trails and kept on the line at all times, the difficulties of the situation will be appreciated. Under these conditions it can be understood readily how lightning-set fires in these remote places become raging conflagrations before the fight against them can be begun.

"In spite of the difficulties handicapping the fire organization, District 1 has made a remarkable record for efficiency, even though a very large acreage in the aggregate has been burned over and many bad fires are still burning.

"Commonly fires due to preventable causes are near lines of transportation and communication and can be discovered and suppressed before they assume serious proportions, but the reverse is true where lightning fires occur. Not infrequently in the most inaccessible mountainous regions ten, fifteen, or twenty fires are started within a few minutes by a single electrical disturbance. Sometimes these blazes are scattered over quite a large extent of territory, often they are close together and before it is possible to start the fight against them they coalesce and form one big fire which, if the wind is blowing freshly, soon reaches the tops of the trees and develops into a crown fire that defies human efforts to combat it so long as the wind continues."

The area of fires was as follows: One-quarter acre or less, 427; one-quarter to 10 acres, 295; over 10 acres, 187, a total of 909, while the total acreage burned was 201,014 acres.

The causes of fires were as follows: Railroads, 179; campers, 131; brush burning, 96; lumbering, 9; lightning, 240; incendiary, 27; miscellaneous, 8; unknown, 219.

"The great majority of these fires have been put out or are now definitely under control and no longer dangerous although still being watched. At the close of July 30, there were not more than 25 fires running uncontrolled, mostly in the mountains of Idaho. On that date approximately 3,500 fire fighters were on the line, this, of course, not including the force of rangers, guards, lookout men, smoke chasers, and other regularly employed forest officers, numbering about 1,500 men.

"Detailed reports on file from the several national forests of the district cover the situation only up to the close of July 30. During the night of July 31, over fifty fires were started by one severe electrical storm that ran along the westerly slopes of the Bitter Root Mountains in Idaho forests. These fires have been merely reported by wire, their extent or precise locations not yet having been determined by the field officers. They were scattered over a territory embracing roughly 4,000 square miles. Does this single night's experience convey an idea of what the Forest Service fire organization in District 1 is contending with?"

F. C. Wilfong and his crew met with a most trying experience during the Selway fire on Crooked Creek on July 24. They were trapped at a point where three fires met, and their camp with provisions, clothes, etc.,

was burned. The party saved themselves only by lying in the Selway River for 35 minutes with wet blankets over their heads. Their train of thirteen pack horses was caught in the track of the fire, but they had been taken to a bunch grass hill, and only one horse was lost. The pack saddles were burned from the backs of the other horses.

Mr. Wilfong says of his experience: "There was no way out of it, we were cornered and we plunged into the water, keeping our faces above the surface. We put wet blankets over our heads for the heat was so intense that our flesh would have been burned if we had not taken that precaution. The roar of the flames was tremendous but we were comparatively safe.

"Once I raised the blanket a little to peek and see how the fire was going and what do you think I saw? There was a big bear perched on a rock right at my feet and looking over at me like he was ready to jump. I guess he thought I was a rock. We exchanged glances for a while and I am willing to bet that he wasn't any more scared than I was, but as soon as he recovered from the surprise, he turned tail and away he went. It was the last I saw of him."

CONSERVATION OF PAPER

ECONOMY in the use of paper will release vast quantities of chemicals which are urgently needed.

A pound of paper wasted means from 1 to 3 pounds of coal wasted.

Cutting down the use of paper 25 per cent would mean 6,000,000 tons less freight for the railroads to haul and would at the same time save 2,500,000 tons of coal.

Old magazines, books, stationery, etc., are used in making books, writing, and other forms of paper.

Paper that comes around purchases at the store is made over again into new paper, cardboard, cartons, paper boxes, paper bags, etc.

One hundred pounds of soft white paper shavings will make 90 pounds of new paper.

One hundred pounds of old magazine paper will make 80 pounds of new paper.

One and one-half million tons of book and writing paper were made last year from old paper.

One hundred pounds of old folded newspapers will make 85 pounds of new paper box board.

Two and one-half million tons of various kinds of paper box board were made last year from old papers.

One hundred pounds of old cotton rags will make from 65 to 75 pounds of paper pulp; this pulp will make only 2 per cent less than an equal amount of paper.

One hundred pounds of new cotton rags will make 80 pounds of paper pulp.

One hundred pounds of old collars, cuffs, pillowcases, or sheets will make 80 pounds of new paper.

Woolen rags are converted into shoddy and shoddy converted into wool. The shrinkage from shoddy to wool is the same as from raw wool to finished wool, namely, about 3 per cent.

One hundred pounds of wool saved or reclaimed provides sufficient material for 25 suits of clothes.

TREE PLANTING TAKEN UP BY MANY EDITORS

NEWSPAPERS OPEN COLUMNS TO DISCUSSION OF LIVING MEMORIALS AND
"ROADS OF REMEMBRANCE" IDEA

READERS of the New York Times find the columns of that paper have been opened to a discussion of the merits of roadside tree planting. The New York Times had a fine editorial on the American Forestry Association's campaign for "Roads of Remembrance" in which it said: "The American Forestry Association is doing good service in linking the causes of roads and forestation. The Road of Remembrance and the shaded highway have a more intimate connection with the general problem of reforestation than may at first appear. Very soon they will become bases for the advance of veritable armies of trees. Nature unaided may be sure, but she is slow. The industrious squirrel carries acorns, hickorynuts, walnuts and chestnuts a rod or so before he buries them—and fortunately often forgets his cache. The winds carry the seeds of maple, pine, and linden a little further. But for reasons at which the forester can only guess there are vast prairies and waste lands without a useful tree. The shaded highway will cross them and the shade trees will scatter their seeds and nuts in the nearby country."

"He who plants a tree is building the world of the future. In twenty years a maple will grow to a sturdy tree, with dense if not widespread shade. And in that time, when wind and soil are favorable, it is already parent to groves of young maples marching from the highway across lands that have hitherto been waste."

This brought out many letters from readers who advocated fruit and nut tree planting. The Times has devoted several editorials since the first one answering some of the letters and sticking mainly to the planting of shade trees. The first letter printed was from Alida (Countess) von Krockow who pictured the roadside fruit trees of Europe. George J. Horowitz, formerly of the Ambulance Service with the French Army, wrote about the virtues of the French roads. Dr. Robert T. Morris contributed a letter, as did Henry Woodward Hulbert on the planting of trees. The Times gives the members of the American Forestry Association a first hand lesson on what can be done if the members will take up these subjects with their newspapers. The editors are keen for just such discussions and while they may not always agree with the writer they are glad to give space to constructive thought. Every member of the association should discuss the need of a national forest policy with the editor of his paper and tell him what the American Forestry Association is doing.

Forty Maples.

A Yankee farmer fourscore years ago
Set forty maples by the highwayside;
Twenty tall saplings stood in either row;
The farmer viewed them with a silent pride.

They grew apace; there children school-ward bound
Loitered in spring to pick the blood-root flowers;
There many a bird found sanctuary ground,
And laborers refuge from the sudden showers.

They waxed in size and beauty when the beams
Of our mid-summer sun's unpitying beat;
Here dusty drivers paused to rest their teams,
And cattle sought a shelter from the heat.

They stately spread; when autumn's pageant came,
And all our valley donned its festal dress,
Rose forty pillars lit with crimson flame,
To stir man's spirit by their loveliness.

But years passed, and the farm fell to a hind—
A prosperous, pushing hind from overseas,
Who, with the full contempt that marks his kind,
Felled in his blasphemy those forty trees.

At times like that one's peaceful spirit longs
For the fierce justice of an elder day,
For the stern sense that trifled not with wrongs,
And did not deem that punishment is play.

Who, save for need, destroys a goodly tree,
Does mischief; and who wantonly may kill
Forty such trees does murder, and should be
Hanged forty fathom high on Gallows Hill.

-G. S. B. in the New York Tribune.

In the *Review of Reviews*, Elbert Francis Baldwin details the devastation in France and Belgium and tells of the plans of the American Forestry Association for helping in the restoration of these forests. Dr. Frank Crane, who writes for a syndicate of newspapers, has devoted another editorial to forestry, this time to the "Roads of Remembrance" idea and also urges co-operation with the Association in its work abroad. This editorial appears in such papers as the *Chicago Daily News*, the *New York Globe*, the *Washington Star*, *Philadelphia Bulletin*, *Atlanta Journal*, *Kansas City Star*, *Cincinnati Times-Star*, *Buffalo News*, *Pittsburgh Chronicle-Telegraph*, *St. Louis Star*, *St. Paul Dispatch*, *Des Moines Capital*, *Milwaukee Journal*, *Sacramento Bee*, *Dallas Times-Herald*, *Omaha World-Herald*, *Binghamton Press*, *Houston Post*, *Richmond News Leader*, *Oakland Post*, *Boise Statesman*, *Baltimore Star* and many others. Here is where the members should co-operate with the Association by writing an appreciation to the editor of the paper in which such features are used. *Leslie's Weekly* has a generous editorial on the value of tree planting and the *New York Herald* takes up the question of better fire protection for forests by saying "with summer fires of unusual severity sweeping the extensive timber lands of Montana, Idaho and Washington, the American Forestry Association is urging the lumbermen to forward their views as to the steps to be taken for the better protection of the woods." The *Herald* then goes on to point to the losses.

The *Trenton Times-Advertiser* devotes a long editorial to roadside tree planting and points to the fact that "if this work is properly carried out it would mean in time a memorial highway across the United States. No finer memorial can be built than a tree bordered highway and aside from tender sentiment connected with such an undertaking there can be no better investment for any community." The *Denver News* calls attention to the fact that the "president of the American Forestry Association has issued a call to the people to beautify their highways as memorials to the men who fought for world freedom. Good roads and tree planting go hand in hand. Federal and local authorities are attending to the road building but it will require voluntary citizen effort to get trees planted." The *Washington Times* points to the famous Potomac Drive made famous by its trees and adds "here is a logical proposition. The roads are to be built. A

road is more than a way to get some place."

The subject of permanent Christmas trees that has been urged by the Association is taken up by the *Milwaukee Journal* under the heading "Waste of Good Timber," the *Hoboken Observer* and the *South Bend News*. The *Milwaukee Journal* says on this point:

"Trees adapted to Christmas use have survived the ills and perils of infant life. Barring accidents, they are sure to live grow, and flourish. It is savagery, if one views it rightly, to destroy them. Yet men who would not harm a full-grown tree hack down treeings without pity or remorse. But if we are to have trees for all time, young trees must be saved."

"The idea of planting trees as memorials for our soldier boys who will not return is a beautiful one," says the *Ohio Farmer* as we find it quoted in the *Fredericktown, Ohio, Press*. "The Christian Endeavor Societies have been making a concerted movement toward planting memorial trees at the original suggestion of the American Forestry Association" the *Times Journal* of Bowling Green, Kentucky, points out. The *Kansas City Star* wants to know "why a billion dollar town is content to look like thirty cents?" And points to the city's shabbiness in the way of vacant lots. Prompt action is urged by the *Hamilton News*

or we will find "this country will have committed economic suicide," says that paper in urging a national forest policy and fire protection for our forests. The *Journal* of Portland, Oregon, reprints the editorial from the *New York Times* on the work of the Association with a letter from I. N. Lipman, an enthusiastic Oregonian, who points out the advertising Oregon is getting because of its good roads, "Replenish the forests," says the *New Orleans Item*, and points to what Kansas and Illinois, known as prairie states, are doing in foresting the land. "It is a melancholy fact," says the *Item*, "that few persons are willing to take steps in time to keep a natural resource from becoming exhausted."

The *Burlington, New Jersey, Enterprise*

has had two editorials on forestry and reprints the editorial from the *New York Times* in full, with a two-column head and the Western Newspaper Union has sent out a special feature on "Roads of Remembrance" illustrated with several pictures. "Grit" uses a half-page feature on memorial tree planting and the International Syndicate of Baltimore has used half-page articles on forestry in general and memorial tree planting several times. The news services, the Associated Press, the United Press, the International News Service and the Universal Service are all using news stories of activities in forestry. The *Christian Science Monitor* used a half column on the need of a national forest policy, and followed it with an editorial on the "World Call for Wood," which concludes that the "need of the hour is to overcome the inertia that has always operated to keep the adequate handling of the forest situation in this country behind the actual requirements." In opening the editorial the *Monitor* points out that "what the people of the United States could accomplish if every

Concord *Monitor* says, "had the forest policy of this country been what it should have been we would have timber for ourselves and for Europe and to spare." The *Houston Post* is of the opinion that "what the country needs is a strong movement to induce the planting of trees similar to the movements that have resulted in such increased production of food for war purposes." The *San Francisco Chronicle* takes up the "Hero Grove" in Golden Gate Park at length. The *Boise Capital News*, in an editorial on the planting of memorial trees by the war mothers, says: "Though the final dedication may be a great public affair, there is something singularly appropriate in this private planting of trees by the people who, when all is said and done, care more than anybody else."

The *Manufacturers' Record* of Baltimore seldom has an issue in which the subject of forestry is omitted. The *Chicago Tribune* has taken up the question of the Forest Preserve near Chicago and calls upon the people to help preserve it by keeping their hands off the beautiful things in the preserve. To quote the *Tribune*: "Why worry about the extinction of the bison and elk and not care a continental whether the things which are native hereabouts live or die?" The lack of shade trees along Harrisburg's streets is the subject of

FAMOUS ELM SAVED IN HUNTINGTON, INDIANA.

The famous Elm Tree at Huntington, Indiana, has been saved by the entire change of architect's plans for a church which is to be erected by the Christian Science Congregation of that city. In a report to the American Forestry Association Daniel Shaeff, who led the movement to save the tree, announces that the architect, Samuel A. Craig, will so redraw his plans that the tree will be left with plenty of root space, and that he will leave out the organist's room and the Sunday School classroom in order that the branches may have plenty of space. This movement, in which the congregation is glad to join, is perhaps one of the most unique ever adopted in order to save a tree. The picture of this tree appears on another page of the magazine.

person having an interest in land would intelligently and persistently raise the trees which his land could conveniently allow space for, has never been measured, unless, negatively, through the obvious waste of tree opportunities every where." It would seem the editor had every member of the Association in mind when he wrote that sentence and a more urgent call for co-operation could scarcely be phrased.

In Montreal the *Daily Star* deplores the fact that trees are fast disappearing from the streets of that city and calls for action. In the *Atlanta Constitution* we find continued co-operation with the Association in an editorial on the terrors of a forest fire. The *San Diego Sun* urges that a tree be planted every time one is cut down and the

a stirring editorial in the *Evening News* of that city. The *Bethlehem Times* is devoting as much as a column a day to features from the American Forestry Association. The *Worcester Post* is urging the planting of memorial trees in that city and has asked the Association for all data on the subject of tree planting. To print a list of the newspapers using news from the Association would be to print the directory of such publications. The greatest of opportunities for members of the Association is at hand. Their co-operation will bring forestry to the front in each locality. Now is the time to act by writing to your editor and sending to the Association anything you see dealing with the forestry problem.

TO SAVE CALIFORNIA REDWOODS FOR AUTO ROADS.

A movement has been started to save the California redwoods along the roads. "The plan is for the purchase by the State of a strip on either side of state roads in the redwood country, along which the giant trees shall be left untouched," says the *San Francisco Chronicle*, "as a memorial of the great groves of the past and a keen delight to the traveler through that region." Edward E. Ayer, of Chicago, who motors through the region every year, has reported to M. H. de Young of San Francisco that in some sections "a battlefield could not look worse than where the lumbermen have been cutting down these giants of the forest."

SUMMER WALKS IN THE WOODLAND

ALONG THE PALISADES IN THE INTERSTATE PARK

BY J. OTIS SWIFT, AUTHOR OF WOODLAND MAGIC

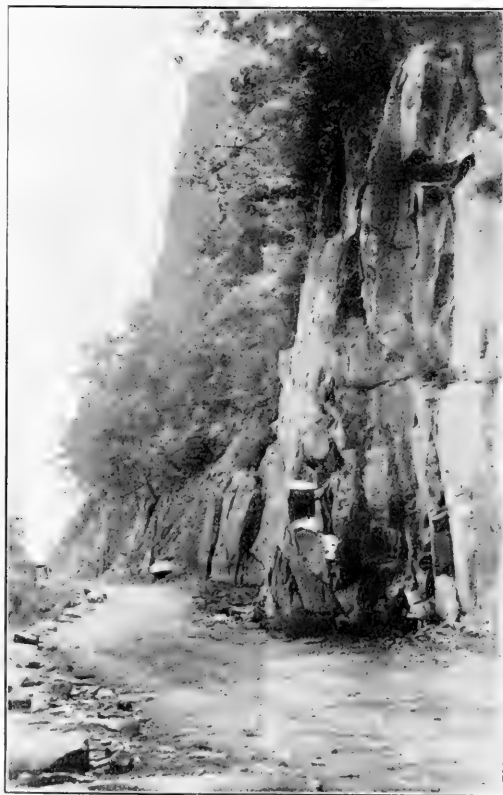
(PHOTOGRAPHS BY THE AUTHOR)

THERE is an order of holy men who go about the world doing good to inanimate things. You will know them by the far-away, detached look in their deep eyes when you meet them in the crowded streets, and by the way they have of looking away over the roof-tops as if used to great spaces and lofty mountains. You will come upon them in the waste places, in the shade of the deep woods, on the margin of the brook, the pitcher plant-haunted, quaking peat of the bog, and walking lonely hill paths in the cool of the evening. Then you will discover that the far-away look in their eyes has gone. In its place is quick flashing attention to every drooping leaf, bent twig, lichened ledge, rabbit path and flitting thrush. These men are priests of the Order of Nature. Sometimes they are old and bent, with palms calloused by the plough handles and the pruning hook. Again they are youths with soft treading feet and poet's mouths. But all are holy, for they have received their initiation as children in the secret places of the deep forests and their lives, among other things, are consecrated to loving, appreciating and caring for inanimate trees, shrubs, plants and mosses that animate nature—insects, birds, animals and men, may be happier. This is the ancient order to which Phny, Linneas, Asa Gray, Donald Mitchell and Thoreau belonged, and to which you and I are initiates. Its members are the sort of men of whom women, children, dogs and wild creatures are never afraid and are usually trustful and fond. There is a secret bond of fellowship between them and every living thing in the wilderness and waste places. So come, this September morning, and we will make a pilgrimage from Hastings-on-Hudson, across the river to the

great Palisades Interstate Park, the most weirdly beautiful spot about the American metropolis.

This park is being developed by the Palisades Interstate Park Commission representing both States of New York and New Jersey, with jurisdiction along the west bank of the Hudson from Fort Lee, New Jersey, to Newburg, New York. The Commission has acquired

all of the Palisades section extending up to the tops of the cliffs from Fort Lee to the State line opposite Hastings, and it is a little out of this wonderland we will visit today, for we cannot hope to explore the summer camp for the military training of youths south of Nyack, rugged Hook mountain at the top of the Tappan Zee, the big Bear Mountain tract a few miles south of West Point, or the Harriman Park section of 30,000 acres running west from the Hudson towards Tuxedo, all in one day. This great park, as wild and romantic in places as a bit out of the heart of the Rockies, has been made possible through money and land appropriated by New York and New Jersey, through the gift of 10,000 acres of land and \$1,000,000 by Mrs. Mary W. Harriman, and gifts by other individuals of various parcels of land, an aggregate of nearly \$2,000,000. It all lies at the doorway of New York City so that a scrub-woman may spend



ONE OF THE NEW AUTOMOBILE ROADS WINDING ROUND THE MAJESTIC CLIFFS OF THE PALISADES.

her day-off in forest depths under the shadows of the frowning palisades for a few pennies and a few minutes' time in getting there on the ferry.

We go down to the wide blue river at Hastings, and row over to the shadow of the cliffs, dropping down with the tide to Alpine, opposite Yonkers. We are seeking solitude, and find it in spite of the fact that thousands of people landed here at Alpine last Sunday and were

swallowed up by the precipitous paths, jungles and hillside forests in a few minutes. We have certain things to say to Mother Nature, and must sit in front of stone altars in inner recesses of the vast rock-heaps at the foot of the purple crags, jumbles of broken trap from the size of a man's head to a house, hurled down by frosts

hinterland, cover stretches of the rock heap. In this grow all—I am sure—of the trees and shrubs indigenous to the locality. Then, rising majestically in sheer wall, fissured battlement, detached pinnacles and weather-scarred, time-colored precipices, to a height of between 300 and 500 feet, begin the Palisades. They are of a

lava rock called trap which was penetrated as a sheet into the Triassic sandstones. Next to Niagara Falls they form one of the most widely known natural phenomena in America, probably because of their nearness to one of the world's great cities. The awesomeness of their dizzy height as we look up, contrasted with the simple sweet beauty of beds of wild spikenard or False Solomon's Seal, tall meadow rue, bloodroot, wild ginger, white baneberry, black cohosh, wild bergamot, pipsissewa, and clumps of mountain laurel, pink azalea, bayberry, blueberry, black-cap raspberry and blackberry, growing all around, appeals us. The beautiful twelve-mile fringe of sloping land



THE ENTRANCE INTO ONE OF THE HUNDREDS OF BEAUTIFUL WOOD PATHS IN THE PARK.

of untold ages, and make our confession. We must ponder upon the persistence of this thing we call Life and which is all around us from the crawling partridge berry vine, woodbine and honeysuckle, binding the

rocks together, to the earth currents palpitating in the solid ledges and rising with the sap in giant old oaks, tulips, black birches, and sycamores, towering above. Leaving the little white house that was Cornwallis' headquarters in the Revolution, and nestles now at one of the nine docks for steamers at the foot of the Palisades, we plunge up a tiny hidden foot path toward the bottom of the crags. A scarlet tanager flutters along ahead to lead us away from her nest, discovered at the end of a black birch's limb. A chipmunk sits on a mossy log and stares, and a gray squirrel scolds from a black oak.

At once we are as far from civilization as if we were lost in the Adirondacks. From the shore of the river the fallen rock debris rises at an angle of forty-five degrees or so, several hundred feet in places. Ages of erosion that started, perhaps, with the deluge, leaf-mould from centuries of vegetation, earth deposited when the Hudson was an unthinkably big stream, draining the Laurentian

under the Palisades is a paradise for artist, naturalist and geologist. Although the State Commission of Conservation, headed by George W. Perkins, has spent much money and done an incredible amount of work building



AT THE FOOT OF THE CLIFFS STILL STANDS THE QUAINIT LITTLE WHITE-WASHED HOUSE WHERE CORNWALLIS, IN LONG GONE DAYS, MADE HIS HEADQUARTERS.

bathing beaches, lawns, boat lagoons, winding paths, automobile roads, log comfort stations, bridges, piers, masonry walls, causeways, and monster rustic pavilions that would have decked a Roman emperor's gardens, the vast wilderness of the park remains untamed and is its greatest asset. "The Commission is doing its best to

preserve the great natural beauties and advantages which God in His wisdom conferred upon the land over which it has supervision." Here and there, lost in the tangles of sumac, wild cherry, black haw, alspice, sassafras and

elderberry are deserted, tumbled-in cellars of colonial houses that were places of importance when the Red Coats were chased across the river by Washington's troopers, but now overgrown by woodbine and wild grapes. The pink and white roses of the colonial women, planted to celebrate the

love of happy homes, have gone wild and bloom luxuriantly, running back to Nature. An hundred old fashioned herbs and flowers that in the course of almost three centuries have escaped from the gardens up over the cliff tops have dropped their seeds over the dizzy edge and taken root below. It is a bird, animal and tree sanctuary, we find as we leave the path two hundred feet up and turn along one of the new automobile roads the Commission is cutting under the lower edge of the cliffs. We

climb up over the slides of broken trap to the top of the age-old crags at one of the places where ascent is possible and creeping tremblingly to the lip of the chasm look away south to the great city sweltering in its heat and noise, to the ships dotting the harbor and river, down to the dock half a thousand feet below us; to Yonkers across the stream, to Graystone once the home of Samuel Tilden, just above; to Hastings where Farragut lived; Dobbs Ferry where nestles on the hillside the home of the late Robert G. Ingersoll; Irvington,

the home of Washington Irving, and Mystic Sleepy Hollow lost in the blue haze beyond Tarrytown. Five miles above us on the west side of the river, glancing along the Palisades, rises Indian Head, the highest shelf of the cliffs, the profile of the old savage, tossed there, it is said, from a blanket in the hands of Hendrick Hudson's sailormen, looking out of the crags in surprise at the changes since his descendants sold their heritage to the Dutch West India Company for a mess of pottage,

or a blanket, or something.

It is all overpoweringly beautiful and inspiring, and we know we can never adequately describe it, but as we look there comes up from a treetop growing out of the rocks below us the clear sweet music of a song - sparrow saying, "tweet, tweet - flutter," which is nonsense, but heavenly



THE PATH WINDING ROUND THE CLIFFS, FROM WHICH DELIGHTFUL GLIMPSES OF THE RIVER FAR BELOW MAY BE HAD.

music nevertheless, and far more indescribable than a marvelous landscape. Descending the crags to where in a deep cool nook, among broken rocks as big as hayracks, a spring pours out, cold and crystal, for our blessing.

We drink, and lying on the mosses, staring up at the cliffs and blue sky beyond, feel our littleness. Here in the silence the spirit of the place comes to us like a quiet caress.

As the sun sinks behind us we go down winding roadways and paths, among deep forests with

occasional glimpses of the river below caught through openings in the dense mat of treetops where the thrushes chant, to the landing—drifting home in our boat on the broad silver river in the moonlight.



ON THE LIP OF THE CHASM—FAINTLY VISIBLE IS THE OPPOSITE SHORE LINE AND A STEAMER WENDING ITS WAY UP THE BEAUTIFUL HUDSON



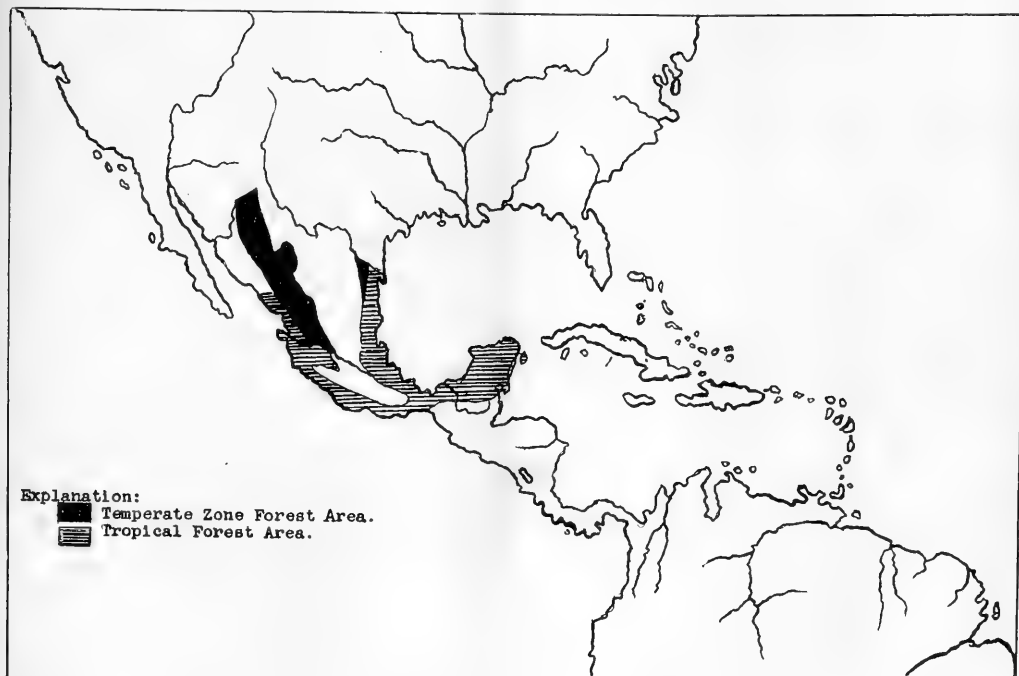
LOOKING DOWN ON THE DOCKS, HALF A THOUSAND FEET BELOW. THIS SPOT, AT THE TOP OF THE PALISADES AFFORDS A MAGNIFICENT VIEW OF THE SURROUNDING COUNTRY.

MEXICO AS A SOURCE OF TIMBER

BY AUSTIN F. MACDONALD

A FEW years will often work startling transformations in the motives and desires of a people; and not the least wonderful is the change which was wrought in the lives of the American people by our participation in the great world conflict. In 1916 we were busily engaged in the absorbing task of making money, we were looking for profitable opportunities to invest that money. In 1918 our sole aim was to win the war, and foreign investments, no matter how alluring, did not appeal to us. But now America has emerged triumphant from the struggle, and the present time marks the dawning of a new era of prosperity. Once more American capital is seeking satisfactory opportunities

valued at \$495,257. While these figures are not large when considered by themselves, relatively they are very important, for the forest products during the year 1913 formed approximately one-eighth of the total exports of the country. We must not conclude, however, that a comparatively small export of lumber means a lack of forests in Mexico. On the contrary, it merely signifies that the great forest areas have not yet been developed and are still awaiting exploitation. The Republic has been estimated to contain 479 square leagues of thick forests and 18,134 square leagues of wooded land. Its forests are rich in every variety of the precious woods, besides great areas of commercial timbers. Because of



for investment, and intelligent information on this subject is rapidly becoming an urgent need.

There is, perhaps, no bit of advice which the American business man has heard more frequently in the past than the suggestion to invest in Mexican timber. Just what kind of timber, and in just what part of Mexico, seems to have been entirely immaterial. Strangely enough, enthusiasm about this timber seems to have been in inverse ratio to the actual amount of knowledge concerning it. The purpose of this article is to state concisely the extent of Mexico's timber resources, and the location of these forested areas.

In the year 1913 the Republic of Mexico exported commercial timber valued at \$3,365,131, and dye woods

the lack of laborers and the difficulty of transportation, and because of the presence of precious metals, exploitation went on very slowly for over two centuries. Now, however, the people are beginning to realize the vast wealth of their forested areas and are developing them at a rapid rate. Wasteful methods of hauling and cutting which are at present being employed will if continued lead to deforestation. More scientific exploitation is needed, and it must come quickly.

One must not conclude from these introductory remarks that all Mexico is one vast forest. There are great stretches of waving grain and of the crops of a more tropical agriculture, and there are vast areas that are uninhabited deserts. For the purposes of this paper

the country may be conveniently divided into three districts. The first of these is the great tropical forest belt. This covers almost the entire peninsula of Yucatan, as well as the small states of the southeast which border on the Gulf of Campeche. Some tropical woods are also found along the Pacific littoral in the far southwest.

The second area is the Temperate Zone Forest Belt. This is located in the northwestern section of the Republic, extending northward almost to the American border. It begins from 100 to 150 miles west of the Pacific coast, and extends eastward over a large strip of territory. Between these two districts is the Treeless Belt, some of which is cultivated, but much of which is arid.

It is from the Tropical Forest Belt that logwood and the other dye woods come. Logwood is found in the southern part of the State of Yucatan, which is in the extreme north of the peninsula of that name along the Gulf of Campeche, and over the entire eastern section of the peninsula. Its exploitation has been neglected for several years. Since the demand for the product was revived, however, several ineffective attempts have been made to resurrect the industry in the Peninsula of Yucatan. These in many instances have not survived the effort to obtain sufficient labor. In the forests of Quintana Roo there are piles of cut logwood which are not available because laborers cannot be obtained to haul them. This difficulty, coupled with the inaccessibility of the product, makes exploitation very difficult, and to a large extent impracticable at the present market price. A lack of vessels is another difficulty which must be met when the product finally reaches the town of export. This logwood is used for dyeing materials and in the manufacture of ink. The largest exportation of the product at present is from the State of Tabasco, which borders on the Gulf of Campeche. This is practically the only export of the state. During two months in 1916, 4,371 tons were exported, valued at \$327,127. All of it was shipped to the United States.

In the Tropical Forest Belt are also found mahogany, ebony and other precious woods. Along the Gulf of Campeche, particularly in the southwestern part of the Peninsula of Yucatan, are great forests of mahogany and Spanish cedar. These are chiefly in the hands of American and native companies, who export considerable quantities. From July, 1911, to June, 1912, mahogany and Spanish cedar, valued at \$1,236,000, were shipped from the small town of Carmen alone. Large areas of the cedar are also found in the interior of the peninsula, but a lack of transportation facilities has made their exploitation almost impossible up to the present time. All along the eastern coast of the Republic, particularly in the southeast, although to a lesser extent further north as well, are found tracts of mahogany in paying quantities. The State of Nuevo Leon, which is situated in the extreme northeast some distance from the coast of the Gulf of Mexico, has the chief area of ebony, which is being exploited rapidly. To the east of Nuevo Leon, di-

rectly on the coast, are large forests of mahogany which have not yet been developed.

By far the largest part of the forest products already exported have come from the Tropical Forest Belt. The Temperate Zone Forest Belt has until very recently been practically undeveloped, and it is from this region that a great increase in the lumber industry may be expected. This area is a broad belt in the northwestern part of the Republic, with its western edge about 150 miles from the Pacific Ocean. The Sierras which traverse Mexico from north to south are well wooded on both their eastern and western slopes. Pine is the commercially important timber, the principal varieties of which, in the order of importance, are yellow short leaf, yellow long leaf and Weymouth. Some oaks, cedars (the kind generally known as cedars in temperate zones) and other hardwoods occur. Thirty-six separate and distinct varieties of hardwoods have been found in the region. In the short leaf pine, trees are quite common measuring from four to four and one-half feet in diameter and running 60 feet without a limb. Spruce and fir are also found in quantity, although pine constitutes approximately three-fourths of the Temperate Zone Forest Belt. The rich timber resources have scarcely been touched, mainly because of inadequate transportation facilities. In the whole region, covering approximately 75,000 square miles, there are less than 1,000 miles of railroads. When new roads which are contemplated or in course of construction have been completed vast tracts of virgin forest land will be ready for exploitation.

One must not imagine, however, that there is at present no development of this belt. Some exportation is now taking place, the timber being mostly white pine of an excellent quality. Turpentine and rosin of a high grade are secured as by-products. In the State of Chihuahua, for example, which is one of the leading lumber states of the Temperate Zone area, the forest products of the State for 1909 amounted to \$1,214,784, consisting principally of pine, \$574,236; oak, \$548,766, and mesquite, \$43,991.

From all of this it may be seen that Mexico has large areas of timber, both of the cabinet and of the commercial woods. Here are splendid opportunities for the investment of American capital, if the problems raised by a lack of labor and of transportation facilities can be successfully overcome. The woods of the Temperate Zone Forest Belt are said to rival in quality those of the United States, and it is only a matter of time when both forest belts will be exploited on a large scale. Is this development to be carried on by American interests, or by the European capitalists who already dominate Mexico financially? American business men must decide.

**CONSIDER THE WOODLOT TO KEEP
IT PRODUCTIVE**

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

SPRUCE TREE 573 YEARS OLD

IN making a survey of the spruce forests, where the airplane cutting was carried on during the war in the Grays Harbor spruce district, the Forest Service found a tree 573 years old, according to its rings. The tree was felled in clearing to make the military camps safe after a limb had fallen and menaced the roof of the officers' quarters. The tree is close to the Olympic highway, eleven miles north of Hump-tulips.

The stump was 11.6 feet from the ground level. The tree was a sapling some two inches in diameter when Columbus was discovering America. Though not the oldest spruce on record, it is premier in age during the present survey.

An effort is being made by the department to get the age of the largest type of Sitka spruce in each of the various airplane enterprises. More than 500 trees have been listed to date.

BOOK REVIEWS

FOREST MANAGEMENT, by A. B. Recknagel and John Bentley, Jr., John Wiley & Sons, New York, price \$2.60. The book contains a condensed and simple treatment of the following subjects: Forest mensuration, Forest organization, Forest finance, and Forest administration and it is written in such a manner as to be readily understood and used by the layman, timber owner and manager. Non-professional students of forestry in colleges and universities and in professional courses not post-graduate grade, will also find it of value as a text.

Forest Management occupies the middle ground between the highly technical and the very elementary textbooks and intelligent study of the principles advocated in this book will stimulate the practice of forest management by owners of timber land—large and small, public and private—to the end that this important natural resource may be systematically maintained and developed.

RED GUM TREE YIELDS BALSAM OF TRADE VALUE

FEW people in the South, where the red gum tree (*Liquidambar styraciflua*) grows, apparently are aware that the gum which exudes from this tree when its sapwood is wounded has commercial value. This "sweet gum," as it is commonly called, is similar in properties and composition to the commercial product obtained from a tree (*Liquidambar orientalis*) indigenous to Asia Minor and known in commerce as "Oriental storax."

According to the United States Forest Products Laboratory at Madison, Wisconsin, small amounts of the dried gum have been used for some time in the manufacture of chewing gum, but since the war curtailed the supply of oriental storax considerable quantities of the fresh "sweet gum" or "American storax" have been put on the market to replace the imported product.

As much as \$2 a pound has been paid to collectors of the gum and second hands have sold it for from \$2.50 to \$3 a pound. These prices, however, are inflated and it is probable that in normal times the gum would not bring more than 50 cents to \$1 a pound.

Storax is used in the manufacture of perfumes, tobacco, adhesives and pharmaceutical preparations, and contains cinnamic acid and cinnamic alcohol, both of which are in demand.

PLANT MEMORIAL TREES

STATE NEWS

CALIFORNIA

THAT public sentiment in California in favor of forestry is steadily growing is shown by the measures which passed the last Legislature and received executive sanction. Besides the general appropriation bill which carries items of salaries, support and printing of the State Board of Forestry, ten other measures which have to do with forestry in California were passed.

A new board of forestry was created to consist of five persons, the State Forester and four persons appointed by the Governor, one of whom shall be familiar with the timber industry, one with the livestock industry, one with the grain and hay industry, and one at large. Another measure provided for the prevention and suppression of forest fires which are defined as any fires burning uncontrolled on any lands covered wholly or in part by timber, grass, grain or other inflammable vegetation. The State Board of Forestry was authorized to divide the state into districts, employ district fire rangers and pay fire-fighting expenses under specified conditions. It was provided that co-operative agreements for the prevention and suppression of forest fires or for reforestation and afforestation purposes might be entered into with federal, county, municipal and private agencies. An appropriation of \$25,000 for the biennial period was made to put this measure into effect.

In addition, a number of forested and brush-covered regions in the state were given protection through the following appropriations for the biennial period:

Fighting forest fires, etc., in the San Dimas Canyon in the San Gabriel Mountains, \$1,600; fighting forest fires in the San Gabriel Canyon in the San Gabriel Mountains, \$3,000; prevention of forest fires in the San Antonio Canyon in the San Gabriel Mountains, \$5,000; for reforestation, construction and maintenance of fire lines and trails, Angeles National Forest, \$5,000; prevention and extinguishment of fires in Tamalpais forest fire district, \$5,000.

The above appropriations were made on the condition that the various agencies receiving direct benefit from this protection, such as the San Dimas Fruit Exchange, Azusa Irrigation Company, San Antonio Water Company and Tamalpais forest fire district contribute an equal amount.

Law enforcement measures were strengthened through an amendment to the Penal Code that requires an effective spark arresting device to be installed on any gas tractor, oil-burning engine, gas-propelled harvesting machine or auto truck harvest-

ing or moving grain or hay, and the carrying of two suitable chemical fire extinguishers by harvesters and hay presses. The section regarding the leaving of camp fires unextinguished was strengthened by the substitution of the words, "Without some person in attendance" for "upon departure."

A chapter in the Civil Code was revised and now gives the United States the right, heretofore limited to the state and counties, of recovering in a civil action of double the damages sustained from fires through wilfulness, malice or negligence, as well as the actual damages if the fires occurred accidentally, and the full costs incurred in fighting any such fires.

COLORADO

ACTING upon the advice of the State Forester, the State Board of Land Commissioners has definitely committed itself in favor of effecting an exchange of school lands, chiefly sections 16 and 36, lying within the National Forests of the State, for an equal acreage and value of lands to be chosen in one or two bodies within some National Forest, in order that a State Forest may be created and handled under forestry principles.

The State Forester, together with Crosby Hoar, of the United States Forest Service, has examined within the Rout, White River and Arapaho National Forests areas which might serve the purpose of the State. During the summer a crew of National Forest men are examining State lands which have not been examined by the State Forester, and the Forest Supervisors are assisting on other National Forests.

Preliminary to this exchange the State Forester has reported on nearly 28,000 acres of State land within National Forests, but the total area of such lands is approximately 115,000 acres.

The timbered school lands in the past have been administered with great handicaps due to the small areas in single bodies, scattered all over the mountainous portion of the State, and under laws and regulations which were not conducive to good forestry practice.

It is believed that the proposed exchange, which is in a preliminary stage at present, will result, if effected, in marked advantage to the State and in considerable advantage to the United States Forest Service, which will not have to contend with the administrative disadvantages of holding within the boundaries of National Forests certain alienated areas.

LOUISIANA

THE Commissioner of Conservation, with the approval of the Forestry Advisory Board, has formally promulgated the spark arrester regulations called for by the Louisiana law passed in 1918. Louisiana, which has so many excellent forestry laws, feels proud to join those few states in the Union which have laws requiring the use of proper spark arresters and ash pans on the trunk lines and tram roads of the state. So far as we know the regulations for wood-burning locomotives and skidders are the first passed by any state; wood as a fuel is not used to any extent today in logging operations except in the South, where our splendid fat pine knots make a mighty fine substitute for coal. The regulations as issued require coal burning locomotives to be equipped with "cabbage-head" stacks and solid ash pans. The coal-burning regulations require no more than what is already the standard equipment on the great majority of railroads in the United States and are modeled along the lines of the British Columbia and New York regulations. There will be, however, a tightening up of the inspection under our regulations. Skidders and loaders or other portable engines used in the woods must be equipped with screens in or over the smoke stacks.

The way the lumbermen and railroads of the state have co-operated with the Department of Conservation in these matters is a very hopeful sign. Two conferences called by the department in March, one for the tram roads, the other for the trunk lines, were very well attended and gave an opportunity for everyone to be heard. A great many of the tram roads did not wait for the issuance of the spark arrester regulations to begin to install the devices recommended by the conference, but got busy at once and ordered the equipment. Other of the tram roads were found to have used cabbage-head stacks and similar devices for many years and they were unanimous in boosting the department's efforts to eliminate railroad fires.

Never again when the fire warden talks to the Louisiana farmer or stockman about preventing fires in the woods can that individual come back and say "why do you pick on us? These — — — dummy engines and locomotives set more fires in a day than we do in a week. Why don't you get after them?" We feel that if the farmers and stockmen will give us as good co-operation as the lumber companies and trunk lines seem to be willing to give us under the new regulations, we shall soon have the fire situation in Louisiana eating out of our hands.

“The Dessert Berry of the Nation” The Erskine Park Everbearing Red Raspberry



The Erskine Park Everbearing Red Raspberry is a seedling from the old reliable Cuthbert, discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardiness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows, regarding this remarkable berry:

“In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Renere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. Its branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large.”

Of this berry we cannot say too much in praise, and we predict

that once known, it will be a standard for planting in every garden and considered a necessity.

The Renere and St. Regis have been the standard up to the present time. In the Erskine Park we have a berry that far surpasses either of these; a raspberry that is a delight to eat, each berry being of largest size, with its delicious melting flesh, full of rich creamy juice, highly flavored and sweet as honey.

Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with blossoms, green berries and ripe fruit upon it.

We have not as yet been able to propagate any large quantity of this magnificent berry, but what we have are the finest Bearing Two-Year Old Plants, heavily rooted and branched that will bring a full measure of pleasure and satisfaction to the planter.



Strong Field Grown Bearing Plants, per six, \$3; per twelve, \$5; per fifty, \$15
One dozen plants set this fall will produce more fruit than two dozen plants set next spring. Plant this fall.

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234,000,000 FEET NATIONAL FOREST TIMBER FOR SALE

Location and Amount.—All the merchantable dead timber standing or down and all the live timber marked or designated for cutting on the Clover Valley Logging Unit embracing about 26,000 acres in T. 23 N., Rs. 14 and 15 E., T. 24 N., Rs. 12, 13, 14 and 15 E., and T. 25 N., Rs. 12 and 13 E., M. D. M. estimated to be 165,000,000 feet B. M. of yellow and jeffrey pine, 7,500,000 feet B. M. of sugar pine, 49,500,000 feet B. M. of white fir, 4,000,000 feet B. M. of Douglas fir, 450,000 feet B. M. of red fir and 7,500,000 feet B. M. of incense cedar saw timber, more or less located within the Plumas National Forest, California.

Stumpage Prices.—Lowest rates considered, \$3.00 per M. feet for yellow and jeffrey pine, \$3.50 per M. feet for sugar pine, \$1.50 per M. feet for Douglas fir and incense cedar, \$.75 per M. feet for white fir and \$1.00 per M. feet for red fir. For material unmerchantable under the terms of the agreement to be removed at the option of the purchaser, for which payment is required by the Forest Service, fifty cents per M. feet. Rates to be redetermined by May 1, 1924.

Deposit.—With bid \$10,000 to apply on purchase price if bid is accepted or refunded if rejected.

Final Date For Bids.—Sealed bids will be received by the District Forester, San Francisco, California, up to and including October 15, 1919.

The right to reject any and all bids is reserved.

Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, San Francisco, California, or the Forest Supervisor, Quincy, California.

MICHIGAN

THE past summer found the compartment line construction work practically completed on two State Forests, the Fife Lake and the Ogemaw. On each of these, a compartment line has been built on the government land subdivision survey lines around each forty acre tract, excepting where swamps or lakes interfere. The Fife Lake Forest contains 7182 acres and the Ogemaw 4284 acres, and the compartment line systems are 112 and 57 miles long, respectively.

In addition to the systems built on these two forests there are some 380 miles on the other State Forests, and the present systems will be strengthened with more line until each forest is equipped as is each of the two mentioned.

These two forests are, probably, the first in America to be so equipped. Since the construction and maintenance of the lines entails considerable cost, it is interesting to note, as offsetting the cost, their value in a general way to the forest in the light of our own experience. To be sure European foresters long ago were satisfied that the construction of compartment lines was essential to the efficient operation of their forests, and the more intensively managed forests of Europe are now well provided.

The lines, as we construct them, are cleared of brush and trees to a width of sixteen feet, all stumps are removed to a width of twelve feet, and a strip ten feet wide is plowed and harrowed. The line is reharrowed or is disced as necessity arises, to remove all grass, ferns, brush, etc., which may start on it. A clean dirt road results. They are the streets of our forests.

As streets they serve the same purposes and have much the same relative value to the forest as do the streets to a city. Along them, one may quickly drive to any fire which may arise, and as the streets of a city act as barriers to the spread of fires, and as bases from which fires may be fought, so do the compartment lines of the forest. Indeed, their value as a means of protecting the woods from serious damage by forest fires is, perhaps, their greatest value at present, and as their use for this means is readily observed, they are generally called fire lines. It is along the compartment lines that telephones are strung, and it is they that, in large measure, bear the vehicular travel over the forest.

The compartments correspond in boundaries with the government land subdivisions, and as each land subdivision is described, so is each compartment line bounding it. Thus we have as names for our forest streets, the names of subdivision lines, for example: north eight line section 36; east and west quarter line section 2; line between sections 11 and 12; etc. The name of the line indicates its precise position in the forest.

The forest is, by the lines, divided and

marked out on the ground (not along on a map) into units of area suitable for administration purposes. If the Custodian wishes to plant a compartment with young trees, he knows that the area is bounded by compartment lines, and that its location is unmistakable; also that he can get to it with a team, if, indeed, not with his Ford.

If the State Forester wishes to undertake special surveys or studies or examinations on any particular piece of land, he knows that he can reach it quickly, and that the ease of his work will be immeasurably heightened through the use of the compartment lines. It is only the forester who has hunted for section corners and lines in order that he might locate his position, who can really appreciate this one value of the compartment line system in the efficient conduct of a forest business.

The Forestry Section of the Michigan Agricultural Experiment Station is making a study this summer of the rate of growth of forest plantations and also nut tree plantations. The study includes costs of establishing, care and maintenance and also intermediate and final returns where possible. The results of the study will probably be published some time during the coming winter.

The Michigan Legislature recently passed a law to encourage the planting of nut-bearing and other food-producing trees along State trunk highways and other roads built in this state. The law makes it the duty of the State Highway Commission and the State Commission of Agriculture to look after the setting out of such trees and of the State Agricultural College and the Public Domain Commission to distribute stock at nominal cost to local officials and private individuals who will set it out. Trees are to be planted at intervals of 20 to 40 feet along the roads. This law is in keeping with the policy of encouraging tree planting announced by the U. S. Department of Agriculture.

NORTH CAROLINA

TEN years ago the United States Forest Service, in co-operation with the North Carolina Geological and Economic Survey, made a study of the Wood-using Industries of the State, the results of which were published by the Survey as Economic Paper No. 20, "Wood-using Industries of North Carolina." This report is now out of print and as there is a continuous demand for information on this subject, the Survey has determined to revise thoroughly and bring up to date this report and publish the results in connection with the forthcoming bulletin on the "Forest Conditions of Piedmont North Carolina," in which portion of the State most of these industries are situated.

Inquiry cards have been printed and are being sent out to a revised list of firms ask-



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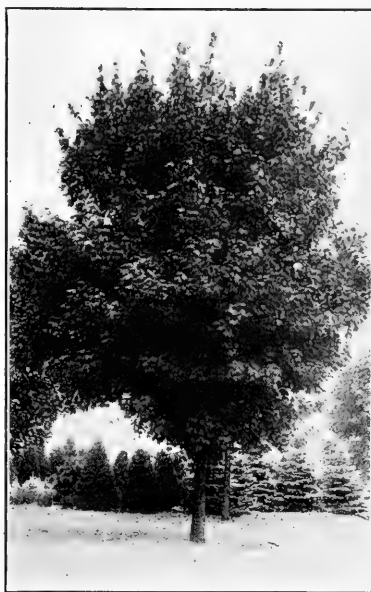
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New York

ing information as to the amount, kind, quality and value of wood used, and the amount and kind of products manufactured. A special effort is being made to compare the past with the probable future source of supply. Ten years ago North Carolina furnished ninety-six per cent of the wood used in her industries; it will be interesting to see to what extent this has been changed by the undoubted rapid reduction in the amount and quality of timber available.

Besides the several large summer schools, covering six weeks study, in session at the higher State institutions of learning, there are being held this year for the first time some forty-five schools of four weeks duration for teachers, under the joint control of the State and County authorities. The attendance and the work accomplished at these local schools have been most encouraging. It is at these summer schools, held usually at the county seats, as well as at the Teachers' Institutes (two weeks term), that the State Forester is lecturing. With a lantern and a set of slides, he is visiting the majority of the summer schools in the Piedmont and eastern sections of the State. The general topics are "conservation" and "forestry" as they apply especially to North Carolina conditions. An outline of the different forest types is given, the uses of the forest touched upon not only as to their products, but their value

for recreation and for soil and water protection; while forestry practice for this State is illustrated and explained. Suggestions are made to the teachers as to how they may interest the children in the observation and study of trees by excursions, school collections, Arbor Day observance, etc. They are urged to recommend the planting of shade trees around schools and homes, the reservation and planting of roadside trees and the planting and dedication of Memorial Trees.

OREGON

At a recent meeting in Portland, Oregon, of the trustees of the Western Forestry and Conservation Association, plans were ratified for reorganizing the scope and personnel of the association to cover far more broadly than ever before both the western protective work and the economic problems confronting the entire industry.

Favorable action was taken on a co-operative plan proposed by the Oregon Forest Fire Association, under which Col. C. S. Chapman, manager of the latter, will take charge of all the fire and similar local work in the five states. The five-state association will furnish him assistance to develop technical fire fighting methods and law enforcement, also increased facilities for educational work with industry and public on protective matters.

Besides these increased activities in the

Northwest, the Western Forestry and Conservation Association will engage more constantly, both independently and in co-operation with the National Lumber Manufacturers Association and other lumber and timber organizations, in working out larger industrial questions and in getting recognition of western needs from governmental agencies. By being relieved of western fire matters, E. T. Allen, who has spent much of the past three years in Washington, will devote himself almost entirely to this work in the east. Much of his earliest attention will be given to relations between the lumber industry and the Treasury Department in working out the new revenue laws affecting income and profits taxation.

PENNSYLVANIA

FORESTER Paul Mulford, in charge of the Stone Forest and Asaph nursery reports that he is raising seedlings in his nursery from seed collected from white ash trees which were set out in a plantation on the Stone Forest in 1907. The trees bore their first seed in 1914 and have been prolific seeders each year since then, except in 1918 when a late frost killed the immature seed. He also reports a heavy attack of white pine weevil, especially on southern exposures, and states that European larch under an advance growth is making only about one-fourth as great a height growth as in the open.

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SALE OF TIMBER, KLAMATH INDIAN RESERVATION CLIFF BOUNDARY UNIT.

SEALED BIDS, MARKED OUTSIDE "BID, Cliff Boundary Timber Unit" and addressed to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon, will be received until 12 o'clock noon, Pacific time, Tuesday, September 23, 1919, for the purchase of timber upon about 10,000 acres within Townships 33 and 34 South, Ranges 7 and 8 East of the Willamette Meridian. The sale embraces approximately 100,000,000 feet of yellow pine and sugar pine. Each bid must state for each species the amount per 1,000 feet Scribner decimal C log scale that will be paid for all timber cut prior to April 1, 1921. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three-year periods. No bid of less than three dollars and seventy-five cents (\$3.75) per 1,000 feet for yellow and sugar pine and one dollar (\$1.00) per 1,000 feet for other species of timber during the first period will be considered. Each bid must be submitted in duplicate and be accompanied by a certified check on a solvent national bank in favor of the Superintendent of the Klamath Indian School in the amount of \$10,000. The deposit will be returned if the bid is rejected but retained if the bid is accepted and the required contract and bond are not executed and presented for approval within sixty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information application should be made to the Indian Superintendent, Klamath Agency, Oregon.

Washington, D. C., July 11, 1919. CATO SELLS, Commissioner of Indian Affairs

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary \$100 to \$120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desires to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forestry matters, together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden service, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is \$1,200 to start, with every likelihood of increase shortly, the salary is guaranteed that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the slack season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years in the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the Northern State Park, District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 800, care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment in the wood or lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 875, care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address, Box 800, care of American Forestry Magazine, Washington, D. C. (9-11)

Forester A. C. Silvius in charge of the Buffalo State Forest in Pennsylvania has established a recreation park within his forest. It has been named Crystal Spring Park, covers an area of about three acres, and is located on one of the main highways of the State.

A forestry literature box has been installed in which popular publications on forestry are placed. These publications

are a source of recreation to the visitors during their stay at the park, and a means of disseminating information pertaining to forestry, for the publications are free of charge and may be taken home by the visitors. Approximately 2,000 bulletins and leaflets have been distributed during the past four months. Forester Silvius is using this practical means of convincing the guests who visit the park that he is trying to give them real service and the Buffalo Forest is open to the public and being developed so that it will yield large quantities of desirable wood and furnish the best form of recreation to all who are fortunate enough to visit it.

District Forester Walter D. Ludwig, Johnstown, Pennsylvania, reports that a number of destructive forest fires occurred during the first week of July. At this season of the year forest fires are usually rare, but on July 4 a fire started which destroyed more than \$1,000 worth of pulpwood belonging to the West Virginia Pulp and Paper Company.

Hereafter any person who desires to make a business of pruning shade trees in Johnstown, Pennsylvania, must pass an examination given by District Forester Walter D. Ludwig. If the applicant satisfies the requirements of the examiner, a license is issued to him upon the payment of a one dollar fee.

VIRGINIA

SEEDLINGS and transplants for reforestation in Virginia will be available for the first time this fall planting season from the Virginia State Forest Nursery.

Evergreens are being grown exclusively up-to-date. They include three species of pine and Norway Spruce. The pines are the well-known white pine (*pinus strobus*), which is native throughout the mountainous parts of the State and the higher parts of the Piedmont section; the shortleaf pine (*pinus echinata*), which is the predominating tree in the Piedmont section of the State, and is also found over much of the mountainous part; and the loblolly pine (*pinus taeda*), which is decidedly the predominating tree in the Tidewater or Coastal Plain section of the State, and occurs scatteringly, and grows rapidly in the Piedmont section of the State. These three pines are expected to predominate in reforestation in Virginia, each in its own section of the State, because of their rapid growth, dense stands, and early and large yields of much-needed material.

The Norway spruce has been planted with much success in many of the Northern States, and is expected to thrive in Virginia, at least in fairly cool and moist situations. It also grows rapidly and in dense stands, producing useful wood.

The number of trees which are expected to be available for use this fall and next spring is as follows: white pine, trans-

plants, 17,000; shortleaf pine, transplants, 13,000, and seedlings, 1,400; loblolly pine, transplants, 8,000, and seedlings, 7,500; and Norway spruce, transplants, 1,000.

Rules for the disposal of these plants will probably provide for distribution to public institutions free of charge, and to land-owners in Virginia at a cost low enough to encourage reforestation and based on the cost of raising them. Trees of the species and sizes desirable for forest planting are not grown by any commercial nursery in Virginia, and it is expected that the example of the State will result in such nurseries putting such material on the market after the market has been developed by the State.

The State Forest Nursery is located at Charlottesville, Virginia, a junction point of the Southern and Chesapeake and Ohio Railroads, on ground belonging to the University of Virginia and placed at the disposal of the State Forester free of charge for this purpose.

TEXAS

MR. ALFRED MACDONALD, a graduate of the Harvard Forest School, has been appointed City Forester for the City of Dallas. City forestry is new in Texas, Dallas being the only municipality boasting of such work. Many other Texas cities have beautiful trees and splendid possibilities and it is to be expected that they will follow the lead set by Dallas when the benefits of such work are appreciated.

A resolution was recently passed by the State Legislature authorizing the planting of pecan trees along state and county highways. The pecan is the official State tree and although it is not suited to conditions in all parts of Texas, yet there are many



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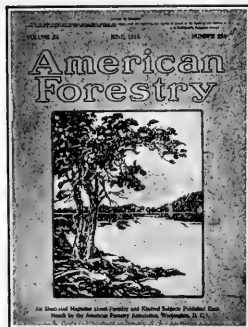
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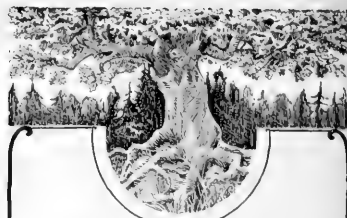
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WISCONSIN

TO put its discoveries into practical use
as soon as possible, the Forest prod-
ucts Laboratory, Madison, Wisconsin, has
adopted the plan of sending out at short in-
tervals a sheaf of so-called "Technical
Notes." These notes are not too technical,
however, for the average wood worker.
They are simply practical suggestions
backed up by many tests, on such subjects
as how to build boxes and crates, make
waterproof glue joints, prevent decay in
wood, tell commercial woods apart, or keep
doors from shrinking and swelling. The
notes are distributed in quantity to the
wood-using associations, to technical
schools and colleges, and upon request to
all others who might benefit by them.

A knowledge of the properties of wood is
as essential for aircraft repair men as for
aircraft builders. The new school for air-
plane mechanics at the Great Lakes Naval
Training Station will give Navy aircraft
repair men a thorough training in the
selection and treatment of airplane woods.
Instructors in this school have been de-
tailed for some time to the Forest Prod-
ucts Laboratory at Madison, Wisconsin, to
collect information for use in their courses.
The laboratory is also furnishing the school
material for a text book on wood identifi-
cation, inspection, conditioning and testing.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Canadian Forestry Association is just sending on the road, for the second season its "Forestry Car." This is a special car fitted with all sorts of fire fighting apparatus, a miniature nursery, samples and pictures of wood manufactures, moving picture apparatus and lectures. This car is sent to regions which have large timberlands or industries and also stops for lectures in the larger cities. Audiences of 600 at one meeting are not uncommon. This kind of propaganda has proved most effective, especially in districts which have been foci of forest fires in the past. Mr. Black, the Secretary, is to be congratulated on his cleverness in devising novel propaganda methods in the efficient way in which he has carried them out.

Sales of timberlands in Ontario, recently made by the Government have realized the highest prices ever paid, in one case \$22.00 per thousand feet, standing.

The Government of New Brunswick has again advanced the dues on timber cut on Crown Lands by one-third and has put into force new cutting regulations. This will mean an increase in revenue of \$150,000 if the cut is the same as last year. Spruce, pine, tamarack and cedar will pay \$3.50 per thousand instead of \$2.50; hemlock, fir and poplar \$3.00 instead of \$2.00. Spruce and white pine shall be cut not less than 12 inches in diameter measured inside the bark not less than 12 inches from the ground. Jack pine, or "Princess Pine" as it is called locally, not less than 10 inches. Fir not less than 9 inches. A fine of \$50.00 per tree in addition to the regular stumpage is imposed. Trees must be utilized to a six inch top and a penalty of \$7.50 per thousand will be imposed for all usable material left in the wood in contravention of the regulations. In case of fire or blow down the Government may compel the licensee to cut and remove such timber before it becomes unusable. If he does not remove such timber he must pay the stumpage in any case. Trees killed by fire or budworm shall only pay two-thirds the stumpage of sound trees. New Brunswick is advancing rapidly along forestry lines and should be heartily congratulated.

The Brown Corporation has bought a hydroplane for mapping their timber lands and has decided to undertake planting operations on their holdings in the United States, planting four trees for every one they cut. They are undertaking this as a patriotic duty. We hope there will be more like them, and venture the statement that

after fifteen or twenty years they will be very thankful that they were so patriotic and far sighted.

In traveling through southern Quebec and northern Maine much damage to balsam and spruce by budworm was noticed.

Plantations of Scotch Pine in Quebec are showing damage from white pine weevil, from a fungus disease and from a rust. Several trees are showing this years shoots falling off and it looks as if the damage is due to mice. Altogether this species does not seem to be a good one to plant.

Norway spruce plantations are doing remarkably well, growth this year being in many cases from two to three feet. Plantations made in 1914, four year old stock, are now six feet and over on fair soils.

Fires in the Prairie Provinces have been disastrous this summer and have been very difficult to control. Northern Ontario has also suffered quite a little.

Arrangements are being made by Dr. Howe of the Commission of Conservation with a number of the large paper and lumber companies to have certain areas cut this next winter under regulations drawn up by him and under the supervision of his men. This will mean some additional slight cost of logging but will furnish very important information in regard to the effect of different systems of cutting. Such co-operation is very valuable and should be encouraged and as widespread as possible.

AIRPLANES FIND FOREST FIRES

REPORTS to the Forest Service, United States Department of Agriculture, from the national forests in California, where Army aviators are making daily flights in search of forest fires, indicate that the innovation has been decidedly successful and that air patrols of the forests will prove so valuable that they will eventually become a permanent part of the work to shield the great woodlands from conflagrations. Numerous fires have been discovered in their early stages by the aviators and have been reported immediately to the forest rangers. It is believed that considerable loss has been prevented by such early discovery. Lack of suitable landing places in this rugged country has proved a handicap in some instances and has caused a belief in certain quarters that dirigible balloons will finally be found more suitable than airplanes for forest flying.

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Pennsylvania State College

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FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

OF the three faculty members who were in the army, Major David T. Mason was the first to return. After being with the school for two months, he was borrowed for the rest of this year by the Treasury Department and will be in Washington until January 1st as timber expert.

Captain Donald Bruce returned to take up his work in Forest Engineering on June 1st after 21 months service in France. While with the A. E. F. he was engaged in securing from the French the timber which was later cut by the 10th and 20th Engineers.

Captain Emanuel Fritz took up his duties as Assistant Professor of Forestry, in charge of the work in forest products on July 1st, after nearly two years in military service.

Professor Walter Mulford, head of the Forestry School, has been given added administrative duties and responsibilities in the recent reorganization of the College of Agriculture. He is now Director of Resident Instruction and chairman of the administrative committee, in which capacity he will have direct supervision of the entire student body of the College of Agriculture. In spite of this added work he plans to give his usual forestry courses next spring.

Dr. Charles H. Shattuck, who was with the school as professor of Forestry from August 1917, until January of this year, has gone into private work with his brother at Idaho Falls, Idaho.

Professor Woodbridge Metcalf has just returned from a trip to the southern part of the state in connection with his study of eucalyptus plantations and the supervision of the Santa Monica Forestry station. He spent a few days with Supervisor Tillotson of the Cleveland National Forest on an inspection trip in the San Jacinto Mountains.

Charles E. Van Riper (20) has brought his bride with him from France and intends to complete his college course.

A. E. Wieslander (15) was married in June to Miss Mabel Holmes of Berkeley. He has taken his bride to the Lassen National Forest where he is engaged as Forest Assistant.

Myron E. Kruger (16) stopped in for a visit on his way from France to Linton, Oregon where he has accepted a position with a large lumber company.

Alex. Muzzall (16) paid a visit on his way to Sumatra where he has gone to manage some of the Goodyear Rubber Company plantations.

Lieutenant Ansel Hall (17) has just re-

turned from some very interesting work under Colonel Greeley in France and is returning to his work with the National Park Service. He has been assigned to a district in the Yosemite National Park.

C. O. Gerhardt (20), G. W. Byrne (22) and J. E. Pemberton (22) are getting some logging experience with the Hammond Lumber Company, Eureka, California.

R. C. Burton (14) is with a reconnaissance party on the Lassen National Forest this summer but will return to his work at the Santa Cruz High School in the fall. He is giving the only High School forestry course in California.

R. W. Beeson (20) is at Ephraim, Utah, at the Great Basin Experiment Station for the summer, working on grazing reconnaissance.

COLORADO AGRICULTURAL COLLEGE

DURING March, 1919, some 25 or more soldiers who had suffered wounds or gassing or had developed incipient tuberculosis were sent to the Colorado Agricultural College by the War Department to be given instruction along lines decided upon by Government advisors and the vocational soldier students in order that recuperation could be effected at the same time that training useful for later life could be given. Undoubtedly giving them something to do actually accelerates their physical improvement.

One young marine who had worked in citrus groves in Louisiana before the war is studying horticulture and, in the Department of Forestry, is studying, as a minor subject tree repair work with the view of repairing fruit trees, using the methods employed by "tree surgeons."

Another Marine who was gassed at Chateau Thierry is fitting himself to be a forest ranger.

Others are pursuing agricultural or mechanical subjects.

Almost without exception these soldiers display much enthusiasm in their studies and make good progress in spite of deficient early schooling in some cases. Accustomed as they are to discipline, they make ideal members of the student body.

The amount of work assigned to each is determined by his physical condition, since his health improvement is given first consideration.

IOWA STATE COLLEGE

THE Forestry Class of the Iowa State College has just completed a months camp on the Arapaho National Forest in Colorado. The men have been engaged in various Forest service operations, such as timber marking, scaling, logging and lum-

bering which has enabled them to gain experience along the practical lines of forestry. The camp was established in the lodgepole — Englemann Spruce country, where there are extensive lumbering operations which enabled the students to secure good experience along the utilization end of forestry. The class returned to Ames the first of September to continue the forestry work.

INDIANA

LIEUTENANT T. I. Taylor, who recently returned from one year's service with the aviation force overseas, is now practicing City Forestry at Evansville, Indiana. Mr. Taylor was graduated from the Forestry Department of Purdue University with the class of nineteen seventeen, leaving the University early for training in the Aviation Service. While in France, Lieut. Taylor had an exceptional opportunity of visiting many of the French State Forests.

Private Troy Fox, who returned from France in July after nearly two years' service with the Twentieth Engineers, has taken a position with the Forest Service in District I. Private Fox reports some very interesting experiences in the forests of France, but much prefers the United States to the Landes.

Prof. Burr N. Prentice, who is in charge of the Department of Forestry at Purdue University is in the Northwest this summer in the employ of the Office of White Pine Blister Rust Control in the Bureau of Plant Industry. Co-operative work is being carried on in the five needle pine States of the west, to prevent the extension of the blister rust scourge into western territory.

The prospects are bright for a record registration in the Department of Forestry at Purdue University. Practically all upper class students will return, and elementary courses are going to be crowded.

MICHIGAN

THE Forestry Department of the Michigan Agricultural College is planning on collecting seed this fall from a white pine windbreak at the college. Two years ago 110 pounds of seed were obtained from this windbreak, which is half a mile long and consists of a double row of trees, spaced about 10 feet apart. The trees are 22 years old and have been bearing seed for some time. This was the first attempt that had been made, however, to collect the seed. The seed was collected by boys climbing the trees and cutting off the cones with a sharp blade on the end of a six-foot stick. The department has called the attention of farmers to the fact that at present prices there might be considerable money in collecting seed from windbreaks or even from individual trees of certain species.

During the spring term 106 freshmen took the course in farm forestry at the Michigan Agricultural College. This course is required of all students in the agricultural course. It covers the care and management of farm woodlands, planting, utilization of timber, basket willows, maple sugar making and other activities connected with the woodland or better utilization of waste lands.

Through the courtesy of the Barrett Company the Michigan Agricultural College has obtained the use of a portable post treating plant, consisting of a tank, firebox and accessories. This plant will be loaned to farmers without charge other than transportation. Many farmers who have only a few posts to treat do not feel justified in getting special equipment, or do not understand the correct methods to use. The Forestry Department of the College plans to give demonstrations in various parts of the State.

Mr. E. C. Mandenberg, the Forestry Extension specialist of the college, has returned after a year's absence on war work. The Michigan Agricultural College was the first agricultural college to employ a man full time for such work. The college has had a forestry extension man for the last six years.

During the past spring the college shipped 180,000 trees from the forest nursery for planting in the State. Since 1909 over 2,100,000 trees have been shipped from the nursery. This is enough to plant an area of 2,000 acres. During the war but very few trees were sold, but the nursery is now getting back to its normal output. The trees used are largely transplants about 10 inches high.

IDAHO

THE School of Forestry, University of Idaho, at the request of the state board of land commissioners, has made a reconnaissance study of the state lands at Big Payette Lake for the purpose of working out a plan for the development of the timber resources of the tract and the recreational facilities of the water front. As a basis for recommendations to the state land board, the University party is making a topographic map of the tract and an estimate of the timber.

The state lands adjacent to the lake comprise some thirteen thousand acres, and the timber on about twenty-five hundred acres was sold last March. The contract under which the sale was made provides that the trees to be cut shall be marked or otherwise designated by the state agent in charge, that the timber left shall be protected from damage in logging operations, that the stumps shall be of a certain height, and that the brush shall be piled and burned or otherwise disposed of to the satisfaction of the state agent. Frank G. Miller, Dean of the School of Forestry, has been designated by the land board as state agent and

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placed in charge of the logging operations for the state.

The plan of cutting adopted is intended to preserve to the utmost the scenic value of the lake slopes. For the most part, the timber immediately along the lake shores will be left intact, a salvage cutting only being made here.

The terms of this contract constitute an important innovation in the management of timber sales on state lands in Idaho, and are attracting wide attention.

Dr. Henry Schmitz, of Washington University, at St. Louis, has just been called to the faculty of the School of Forestry. He graduated with honors from the School of Forestry, University of Washington, Seattle, in 1915. In September, 1916 he was appointed a fellow in the Shaw School of Botany of Washington University, St. Louis, from which he graduated in June, 1919 with the degree of Doctor of Philosophy, writing his thesis on the "Relation of Bacteria to the Decay of Wood." From July, 1917 to January, 1919, Mr. Schmitz was in the U. S. Naval Reserve Force where he served with distinction. He has had practical experience in the forests of the Northwest with both the U. S. Forest Service and private concerns. Dr. Schmitz comes to the School of Forestry with the best endorsements from those who know his work. Dr. G. T. Moore, director of the Missouri Botanical Garden, says of him, "As an investigator he has shown himself capable of conducting high grade work independently, and there is no reason why he should not make a distinct mark for himself because of his ability in research."

I. W. Cook, associate professor of forestry was with the Rose Lake Lumber company during the summer, engaged on stumping appraisal work.

NEW YORK STATE COLLEGE OF FORESTRY

"TAKE the Returning Soldiers Back," is the policy of the New York College of Forestry at Syracuse, at the head of which is Dean Hugh P. Baker, who won a commission as captain of infantry. Five returning soldiers have been given positions in the faculty of the college. All are men who were formerly with the college, and the appointments are as follows: Russell T. Gheen, formerly with the extension department, later with the Southern Pine Association, captain in field artillery, returning to the extension department for special work in New York state, particularly for lecture work.

Reuben T. Pritchard, assistant professor of silviculture, first lieutenant with Battery F, 345th Field Artillery, of Texas; George H. Cless, Jr., formerly of the extension department, later with the National Lumber Manufacturers association in charge of exhibits, first lieutenant with trench mortar

battery in Italy, and in charge of a military commission to investigate food supplies in Hungary and Serbia after the armistice; Oliver M. Porter, Captain Quartermaster Corps, with troops in Europe, former faculty member; Allan F. Arnold, formerly with the extension department, who returns as sergeant, but with a special citation for bravery in action.

New Professor of Forest Extension

Warren B. Bullock, former Milwaukee newspaper correspondent and magazine writer, has been made professor of forest extension at the New York State College of Forestry, Syracuse, New York, marking what appears to be a new campaign of advocacy of forest development. Mr. Bullock has been in newspaper work in Milwaukee nearly 20 years, as reporter, editor and head of the news bureau bearing his name. He became interested in forestry while publicity manager of the National Lumber Manufacturers' Association.

The selection of Mr. Bullock for the eastern work evidently is a part of Dean Baker's plan to go to the people of the State with his advocacy of modern forestry methods.

PENNSYLVANIA STATE COLLEGE OF FORESTRY

THE Freshmen Forestry Camp of the Pennsylvania State College, was held on a 1400 acre tract of young timber near Lamar, Pennsylvania, which is about 30 miles from the College. This is the permanent camp site for Freshmen.

The Sophomore Camp was with the Central Pennsylvania Lumber Company at Laquin, Pennsylvania. The lumber mills at Laquin and Masten were studied and the logging operations at Hillsboro. Side trips were taken to study the many wood-using industries in the region.

Professor George R. Green, who has been in charge of the section of wood technology at the Naval Aircraft Factory, Philadelphia, returned to State College during July to give the work in Forestry and Tree Identification in the Summer Session of the College for teachers.

Lieutenant W. G. Edwards, Assistant Professor of Forestry, has returned from France where he was with the 10th Forestry Regiment and later with the 20th Regiment. He will have charge of the courses in lumbering.

The Forestry Department has recently been placed in charge of the 200 acres of woodlands on the college farms which cover 1500 acres of land.

An arboretum will be started in the fall which will include all the woody vegetation indigenous to the state of Pennsylvania.

PENNSYLVANIA STATE FOREST ACADEMY

ON August 13 three seniors completed their 144 weeks' course at Mont Alto. Four other seniors will return in September and work until January 1 to cover work missed while in the Army or Navy. In all seven men will complete work for their B. F. in 1919.

Four other service men will return to school this fall, entering the second and third year classes. All service men will then have returned to school, except two who have received permanent Lieutenances in the regular army.

On September 2, with the beginning of the new school year, 33 men were enrolled at the school. The faculty consists of: Prof. E. A. Ziegler, A. M., Forestry and Surveying; Prof. W. M. Drake, M. S. F., Forestry; Prof. George S. Perry, B. F., Forestry; Prof. C. J. Harris, M. S., Biology; Prof. Eugene P. Deatrick, Ph. D., Chemistry and Soils.

The Legislature adjourning in June granted an increased appropriation for 1919-20.

The chestnut blight is at the height of its attack and the school forest is losing in excess of 100,000 cords of its growing stock on its 23,000 acres. Forester Staley will salvage probably 20 per cent of this through sale of the stumpage, sale of poles, extract wood and some lumber taken out by forest employees. The students have here an excellent study of the utilization of second growth hardwoods which will be the principal product of the young state forests for a considerable period. The gross income for 1919 will be about \$12,000.

Prof. J. S. Illick has severed his connection with the Forest Academy and is now Chief of Division of Silviculture of the Department of Forestry with his office at Harrisburg.

With deep regret the school announces the loss of Andrew L. AuWerter, Class of 1919, the only undergraduate to fall in action in France. He had enlisted in the Marines and fell in the fighting in the Argonne shortly before the armistice.

FOREST FIRES DETECTED BY AIR SERVICE

THE importance of the army Air Service at this time when disastrous forest fires are raging in Montana, Idaho, Washington and Oregon, not now under aerial fire protection, is indicated in California where the Air Service has been the means of detecting many fires which have been quickly extinguished.

During the week ended July 19 flying officers of the March, Alessandro and Rockwell fields made a total of 65 flights covering 7,707 miles in a little more than 100 hours and discovered ten fires. For the

four weeks ended July 19, 259 flights were made and 27 fires discovered.

The balloon division is doing superior work from its Ross field, Arcadia station, and so intense is the interest in the work that the commanding officers are participating personally in observations.

WIRELESS PHONE IN FOREST WORK

THE Forest Service wireless telephone has been successfully tried out in Portland. As a result instruments will be installed on Mount Hood for use in case of forest fires. One station will be at the summit of the 11,000-foot snow clad peak and the other at the Zigzag ranger station.

The test which was made recently by C. M. Allen, telephone engineer of the Forest Service at a distance of eight miles was eminently successful.

BOUQUETS

"Permit me to add my measure of praise concerning the improvements in American Forestry. Not only is it a pleasure to look at but the contents are interesting to everyone who loves the out-of-doors." F. F. Moon, Santa Barbara, California.

"My advertisement in your July issue has been entirely satisfactory, and from the various answers received I have made a satisfactory selection." Frederick Osborn, New York City.

"The magazine is, in my opinion, both a typographical and artistic gem, in the special field of its usefulness."—Mrs. Rufus Choate.

You have such splendid articles and illustrations in American Forestry—it always seems a clear echo of a delightful tramp."—Julia A. Thorns.

"I have taken American Forestry for several years, and have found it more and more useful and instructive."—Homer I. Ostrom.

"I appreciate the information American Forestry brings me each month."—W. A. Wells.

"I am greatly interested in your work and regard your publication as both valuable and fascinating."—Charles Nagel.

"I certainly enjoy the articles in American Forestry by Dr. Shufeldt and also the ornithological articles by Dr. Allen."—Wm. E. Menzel.

"It is very gratifying to find that American Forestry is attracting so much attention. I certainly think that the special June number was a great credit, and the July issue was also extremely interesting."—Chester W. Lyman, New York City.

"I read, with great interest, the magazine of the Association and certainly think it is a 'dandy.' I look forward to its arrival each month and would not miss it for anything."

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By John J. Ingalls

Late Senator of Kansas

"GRASS is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleagured by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of Spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world."

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigation, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming, and those best suited for forestry; and liberal National and State appropriations for this work.



**It's
toasted**



Between lunch and golf

Time for a cigarette before the first tee. Tastes fine after that delicious cup of coffee. You remember how good it was—the rich taste of the toasted coffee. Now—as you light it—notice the same thing in your

LUCKY STRIKE
cigarette

It's toasted... And rich in flavor,
because like the coffee, it's better
"roasted" than raw.

It's toasted

The American Cigarette Co.

American Forestry

GETTING AN AUDIENCE

THE EFFORT TO SECURE A NATIONAL FOREST POLICY WILL BE GREATLY AIDED IF PEOPLE ARE FIRST INTERESTED IN TREES. THEY WILL THEN LEND A WILLING EAR TO THE DISCUSSION OF THE CARE OF TREES AND THE PLANTING OF TREES ON A WHOLE-SALE SCALE. FOR THIS REASON THE AMERICAN FORESTRY ASSOCIATION HAS INTERESTED THOUSANDS IN MEMORIAL TREE PLANTING.

EDITORS OF THE COUNTRY HAVE BEEN QUICK TO SEE THE POINT AS IS EVIDENCED BY "THE GLOBE-DEMOCRAT" OF ST. LOUIS, WHICH SAYS: "IF THIS MEMORIAL TREE IDEA SERVES TO INCREASE THE NUMBER OF LOVERS OF TREES, THE MOVEMENT TO PRESERVE OUR FORESTS FOR THE FUTURE NEEDS OF THE COUNTRY WILL MAKE MORE RAPID PROGRESS." THAT EDITORIAL WAS BASED UPON THE SUGGESTION OF THE ASSOCIATION FOR PLANTING TREES AT LACLEDE, MO., IN HONOR OF GENERAL PERSHING.

THE EDITOR OF THE HOUSTON "POST" TAKES UP THE ASSOCIATION'S FIGURES ON THE TIMBER SHORT-AGE AS THEY AFFECT THE PRICE OF LUMBER FOR HOME BUILDING AND SAYS: "PUBLIC SENTIMENT MUST BE AROUSED IN FAVOR OF A MORE ADEQUATE AND DEFINITE POLICY BY THE GOVERNMENT IN REGARDS TO FORESTS FOR THE BEARING IT HAS UPON THE HOMES AND THE COST OF LIVING, IF FOR NO OTHER REASON."

HERE WE HAVE TWO FINE EXAMPLES OF "GETTING AN AUDIENCE," FOR THE AUDIENCE UNDERSTANDS ABOUT THE HIGH COST OF LIVING AND ABOUT THE LOVE FOR A TREE. THROUGH THESE THEY WILL BECOME INTERESTED IN A NATIONAL FOREST POLICY.

CHARLES LATHROP PACK,
President, American Forestry Association.

The American Forestry Association

Washington, D. C.

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Ex-Pres., National Conservation Congress.

Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigation, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

OCTOBER, 1919 VOL. 25

No. 310

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NOTICE TO OUR READERS

As this magazine goes to press announcement is made of a severe fire in the offices of the American Forestry Association in which many of the valuable records, papers and all back issues of the magazine, etc., have been totally destroyed. It will be necessary to ask that any letters of inquiry or other correspondence addressed to the Association within the last ten days be repeated. Delays in the conduct of the current business of the Association and the issuance of the magazine, **AMERICAN FORESTRY**, must necessarily follow, and indulgence and leniency is asked of our members.

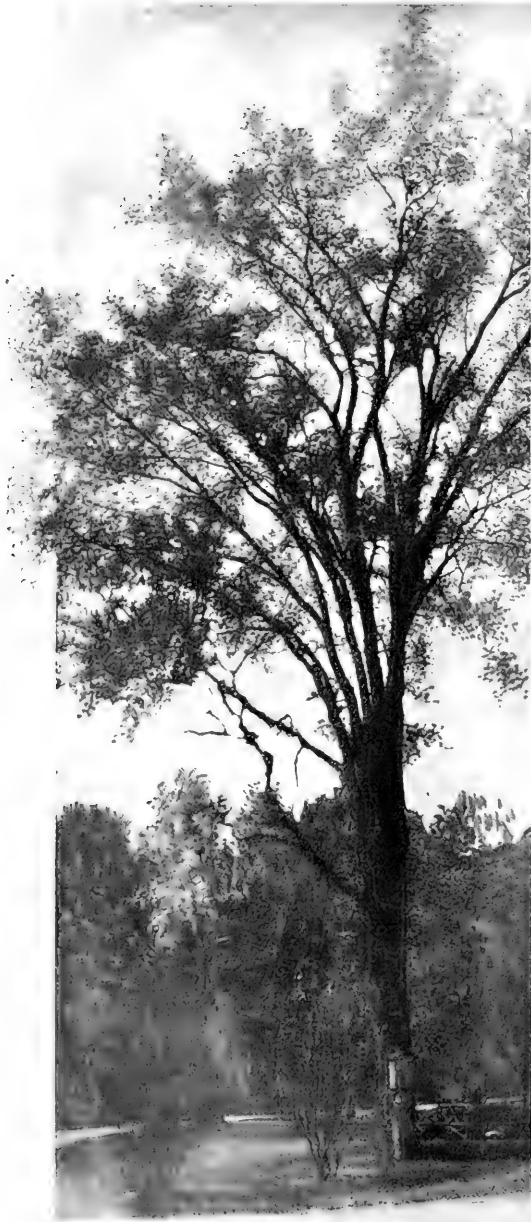
P. S. RIDSDALE.

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LLAO ROCK

The famous sentinel in Crater Lake, National Park.





"Roads of Remembrance"

IT is the suggestion of the American Forestry Association, made the day following the signing of the armistice, that trees be planted in honor of America's soldiers and sailors, both as memorials to the dead and as tributes of appreciation to the living for their offer of service.

The Memorial Tree planting idea strikes a patriotic chord which should receive the support of the Bankers of America. For it is but the beginning of a great forward-sweeping desire and determination on the part of the people of America to see their cities and parks and local, as well as transcontinental, highways beautified with handsome trees and their forest resources enriched through a deepening and broadening of conservation methods and reforestation.

In connection with the movement, there is a plan proposed which would provide for a county unit system placing memorial tablets to the men who gave their lives for their country, the tablets to be placed on the county courthouse or on memorial highways extending from county to county, preferably at the points where these roads enter adjoining counties.

Cities large and small throughout the nation are showing their approval of "Tribute Trees." In our parks and along our highways they will serve as a living tribute to American heroism. They will mark our "Roads of Remembrance."

THIS IS THE PAGE FROM THE BURROUGHS CLEARING HOUSE, A PUBLICATION FOR BANKERS, IS AN EXAMPLE OF THE FINE CO-OPERATION THAT IS BEING GIVEN THE CAMPAIGN OF THE AMERICAN FORESTRY ASSOCIATION FOR MEMORIAL TREE PLANTING AND ROADS OF REMEMBRANCE. HERE IS A PUBLICATION DEVOTED TO BEST BUSINESS METHODS YET ITS EDITOR IS QUICK TO SEE THE OPPORTUNITY IN MEMORIAL TREE PLANTING FOR BETTER ROADS WHICH MEAN BETTER BUSINESS AND A BETTER COUNTRY.

AMERICAN FORESTRY

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OCTOBER, 1919

NO. 310

THE FOREST POLICY OF FRANCE--ITS VINDICATION

BY W. B. GREELEY, LIEUT.-COL. ENGINEERS

"FRANCE will perish for want of wood," exclaimed Colbert in 1669. The fears of this far-sighted Minister of old France, which led to a revision of forestry laws that has profoundly influenced all subsequent legislation, might indeed have been realized in this great war. Wood was one of the most vital military necessities; and France had to supply from her own forests not alone the needs of her own vast armies for four and a half years but also the larger part by far of the

element of national strength in the greatest crisis of her history.

The development of this policy has not been smooth and uninterrupted. It has suffered setbacks. It has reflected the social and political upheavals of the last two centuries. It has been influenced by changes in economic conditions and emphasis. Certain chapters in its history bear a striking resemblance to the disposal of public timberlands in the United States. As a whole, it



A TRAINLOAD OF LARGE HARDWOOD LOGS CUT FROM ONE OF THE ROTHSCHILD ESTATES BY THE 20th ENGINEERS

timber used by the British, Belgian, and American forces. The American operations alone required 450,000,000 feet of timber and 650,000 cords of fuelwood, and less than one per cent of this enormous quantity was brought from the United States. For the abundant supplies of timber directly available to the battle lines, the Allied world must thank the patience and foresight with which the French nation has built up its forest resources. Apart from its value to her peace-time life and industries, the forest policy of France has been vindicated as a capital

is a fruitful field of study for the American forester and economist. Particularly at the present time, when the war has brought home to us the weakness and danger of our own indifference toward the forest resources of the United States, is it opportune to take note how similar problems have been worked out in France. I hope, in subsequent articles, to describe a few of the more important features of French forest policy, the "regime forestier"—its backbone, private forestry in France, and the fight against sand dunes and mountain torrents. I shall

try now to give a picture of French forestry in the broad, its historical setting, the national conceptions which it expresses, and what it has accomplished.*

The forestry ordinances of the "ancien regime" contained a mass of detailed restrictions, designed not only to prevent a diminution in the forested areas but also to control the methods of cutting and using timber. Hardwood sprout forests could not be cut before the age of ten years; and then a certain number had to be reserved to produce large timber. The age when large trees might be cut and methods of securing regrowth were carefully defined. The needs of the royal navy were protected by requiring special sanction from the king before large timber could be cut within 10 leagues of the sea or 2 leagues of a navigable river—a regulation which calls to mind that the first forestry legislation of the United States was the reservation of oak and cypress lands for the supply of the American navy.

This forestry code was in keeping with the whole rural legislation of the times. The freedom of land owners was restricted at almost every turn by royal decrees. Vineyards could not be planted in certain cantons. The fallowing of land at stated periods was obligatory in nearly all forms of culture. It is significant that the public interest was but a secondary and incidental object of these onerous restrictions. The king regarded himself as the guardian of his people; and sought to

*Much of the material for these articles has been taken from Guyot's *Cours de Droit Forestier*.

protect his subjects against injuries to their own interests.

The great outburst of democracy and individualism in the French Revolution unceremoniously threw this maze of restrictive legislation out of doors. The free citizen of the new era was released from all guardianships. A law of 1791 declared that the forests of private owners ceased to be under control of the State. Their owners were free to cut or destroy as they saw fit. During the succeeding half century a large number of private forests were wiped out. Even after public control of the denudation of private woodlands was restored, its application was extremely lenient for many years. Authorizations to destroy 489,000 hectares (1,222,500 acres) were granted subsequent to 1828, no records prior to that date being available. The demand for cereals, particularly in northern France, had much to do with the large aggregate decrease in the forested area of the country, for many of the French forests in the plains occupied land similar in character to that under cultivation. In southern France and in her mountains, the predominance of pastoral industries led to a gradual diminution in the area of woodland from excessive grazing.

Modern French writers are agreed that this suddenly gained liberty of the Revolution was abused; that the transition from the restrictive guardianship of the sovereign to the new regime of "laissez faire" was too rapid and the land owners too inadequately prepared to use their freedom. But the movement as a whole was an inevitable and necessary part of the change from the old





ANOTHER OF THE SAWMILLS OF THE 20th ENGINEERS IN THE VOSGES MOUNTAINS

political and economic order to the new. It extended indeed to the state forests, sequestered properties of the crown and nobility. Particularly during the period from 1814 to the end of the second Empire, a large number of state forests were alienated under the theory that it was wise to convert this public property into cash and that the land would best contribute to the economic welfare of the country under private ownership and use. These alienations carried no restrictions as to cutting or denudation and in the case of most of them reforestation was left to chance.

The most interesting feature of this history is not the extent of the reaction but the rapidity and effectiveness with which French common sense and French conservative instinct toward natural resources reasserted themselves under the very freedom of democratic institutions. As early as 1803, a law restored public control of the extent to which privately owned forests might be destroyed. And in 1827 was adopted the "code forestier" which, with minor modifications, has remained to the present day as the corner stone of French forest policy. The forestry code aimed primarily to establish the basis for administering and perpetuating the forests in all forms of public ownership. But the conceptions underlying it are of special interest as illustrating the attitude of the French toward their forest resources as a whole—private as well as public; an attitude which finds expression in practically all the subsequent legislation.

The French conceive of their forests as standing apart from other forms of real property because of (1) their peculiar nature from the standpoint of principal and interest and (2) their public utility. The trees compos-

ing a forest at any given time represent its capital, or growing stock, together with certain quantities of wood which have been produced by that capital and comprise its expendable revenue, which will be realized from time to time by cutting. Revenue and capital are thus intermingled; both are readily convertible into money; and the danger of reducing the forest capital of the country by unwise or ill-timed lumbering is always present. Furthermore, a forest once ruined by abuse restores itself slowly. While a few years can efface the effects of poor farming, a century may be required to restore a forest capital reduced or destroyed by imprudent cutting. On the other hand, their public utility demands that the forests of the country be extended rather than reduced. Forests figure largely in the public policies of France because the French know that, aside from their direct economic value, forests hold the soil on mountain slopes, prevent erosion, stop the devastation of shifting sand, preserve the sources of their rivers and their marvelous inland waterways, and maintain the atmospheric humidity necessary for the cultivation of the valleys. Hence the necessity of special and restrictive legislation, going far beyond the terms of the common law, even beyond the provisions of the penal code, to preserve the integrity of French forests, public and private alike.

This conception is well expressed in Guyot's discussion of the laws against the destruction of privately owned forests.* "This legislation constitutes a remarkable anomaly in our civil law concerning the legal obligations imposed on private property. In principle, the private owner is free to use and enjoy his property, free

*Cours de Droit Forestier, Livre V., Par. 1659

also to dispose of it and to change it as he pleases. The prohibition of denudation applies to but one class of landed property, the forest. An agricultural proprietor can transform his property, make a meadow of a cultivated field, a pasture of a vineyard; but such changes are forbidden to the forest owner. He must preserve his property in a forested condition even when he might profit by a change. This lucrative operation is forbidden him in the public interest. He might, indeed, be indemnified for the heavy burden which is imposed upon him. But he can seek no compensation, no remittance of taxes, no special favor.

"How shall we justify an intervention of the state so exceptional, a limitation so extraordinary upon the rights of every private owner? It can be explained only by the special nature of forested property. It is this character peculiar to itself which has prompted the enforcement of a forestry regime upon public owners like the

of administering forests owned by the state, the communes, and by public institutions, based upon continuous production and the cutting of no more than the current growth. It contains its own, distinctive, and complete penal system for the protection of these properties. Its penal code is almost taken bodily from that existing under the "ancien regime" and differs profoundly from the modern penal laws of France. Its basis is the fine, imposed in accordance with fixed and arbitrary schedules, which are obligatory upon the courts and leave the judge no discretion to consider mitigating circumstances. These penalties are set forth in minute detail, even to the imposition of heavier fines in cases where trees are cut at night or with a saw because such trespasses are more difficult to detect. The forest officers themselves exercise many judicial functions in the punishment of trespasses. They may even enter that stronghold of French individual liberty, the home, without



MULE TEAM BRINGING MARITIME PINE LOGS TO A MILL IN SOUTHWESTERN FRANCE

communes. The forest once destroyed is so slow to reestablish itself that future generations must be guaranteed against abuses by the present generation. If the country needs wheat, nothing is easier than to increase the culture of cereals from one year to another; but if the need be for wood, the creation of new forests will require long years during which the public interests will suffer gravely."

The most striking examples of this solicitude for the preservation of their forests are found in the French administration of publicly owned forests and in the laws preventing the denudation of woodlands in private ownership. In each appear significant exceptions to the general principles which the individualistic and liberty-loving French have incorporated in their legislation since the revolutionary period. The "code forestier" not only defines in precise terms the methods

warrant, in search of evidence that offenses have been committed.

The laws concerning private forests impose no prescribed methods of cutting other than the obligation resting upon every owner not to destroy his forest without prior warrant from the state. Such warrants may be issued by the Minister of Agriculture upon a favorable report from the Conservateur of Waters and Forests, but may be refused on the ground that the proposed denudation would be injurious to the protection of mountain soils from erosion, to the protection of inland areas from shifting sand, to the sources of streams, or to the public health. It is to be noted that the right to destroy a forest can not be withheld on the grounds of the needs of the country for timber, although many attempts have been made to incorporate such a provision in the law. The teeth of the legislation concerning the denudation of

private forests are found in the severe fines which are imposed if the destruction of a forest actually takes place, without warrant, and in the discretion of the Minister to order the reforestation of the land by planting. If this is not done by the owner within three years, it may be done by the state at the owner's cost. It makes no difference whether the denudation was intentional or not. The penalties are applicable if a forest actually disappears as the result of severe cutting or grazing.

These restrictive measures constitute but one phase of the forest policy of France. Its constructive features are equally striking. Foremost among them in commanding the admiration of the forest engineers in the American Army stands the conquest of the sand dunes on

pine under a cover of brush or herbaceous plants. Their success led to the adoption in 1810 of a systematic plan for controlling the dunes by the French government. State forests were established in part of the territory; but much of the planting was done on communal and private lands, under the principle of the state's paying the costs and then retaining the use of the land for a sufficient period to recoup itself from the forests established.

The stabilization of the dune belt was actually accomplished in about sixty years, but the impetus given to the planting of maritime pine by private owners and communes has extended the forests of this valuable tree over almost the entire area of sand plains in southwestern France. The departments of the Landes and Gironde



Underwood and Underwood—British Official Photograph

GERMAN TRENCHES SMASHED UP BY BRITISH GUN FIRE IN THE BATTLE OF FLANDERS. THIS GIVES AN IDEA OF THE AMOUNT OF TIMBER USED IN FIELD FORTIFICATIONS

the southwestern coast and the conversion of the old bed of the Atlantic Ocean, formerly a thinly populated stretch of sand and marsh, into one of the most productive regions of France. Adjoining the South Atlantic Coast, is a belt of sand dunes covering some 350,000 acres. During the 18th century, the inland movement of these dunes, which traveled from 30 to 80 feet a year, buried entire villages and farms and threatened to destroy the economic life of the entire littoral. Experiments were begun by French engineers as early as 1784 in stabilizing the dunes by sowing the seed of maritime

contain today 1,500,000 acres of private forests, by far the greater part of which were established by planting. The forests of this region, created almost wholly by human foresight and patience, contained nearly a fourth of the timber of France at the outbreak of the war and were one of the most important sources of supply for the French, British and American Armies. The 20th Engineers cut ties and sawlogs from state forests in the dunes themselves which, sixty years previously, were not only wholly unproductive but a menace to the country. And aside from the production of timber, the afforestation of

the Landes has created the naval stores industry of southern France, drained its malarial marshes, enormously increased its population, and built up the productivity of its agricultural lands through the extensive cropping of forest undergrowth and litter for the fertilization of farms.

A similar struggle, not yet ended, has been waged with



BRUSH FROM FRENCH FORESTS USED IN REVETTING TRENCHES

the mountain torrents which have seriously eroded portions of the French Alps, with resulting floods and the destruction of agricultural lands in the valleys below. One of the worst effects of the sudden removal of restrictions upon the use of private lands, brought about by the Revolution, was the destruction of many forests in the high mountains and the excessive grazing of mountain pastures. Effective legislation to combat these perils was long held back by the difficulty of harmonizing the vigorous public action needed with French conceptions of individual liberty and initiative and by the conflict of interests between the pastoral folk of the mountains and the farmers of the plains. The terrible floods of 1859 prompted the enactment of a law for the reforestation of the mountains (July 28, 1860). It provided for the establishment of restoration areas within which reforestation and other measures would be undertaken by the state and by communes and private agencies with state aid. All forests within restoration areas, of whatever ownership, were placed under the administration of the Waters and Forests Service in conformity with the conservative requirements of the "regime forestier." Additional laws passed in 1864 and 1882 provided for the restoration of grass cover on denuded mountain lands under certain conditions and for various preventive measures in the mountain zone generally, particularly the regulation of grazing.

Some phases of this attempt to check torrential erosion in the mountains have not been successful, and the problem is a very live one in France today. The most effective steps yet taken have been the reforestation of lands owned by the state or communes and the purchase of mountain forests by the central government. This is

directly analogous to federal purchases of forests on the headwaters of navigable streams in the United States under the Weeks Law. While the French government has ample authority to add to its state forests, by purchase, in any part of the country, such acquisitions have, up to the present, been limited to mountain regions in connection with restoration projects. Many French foresters and economists advocate the extension of the public holdings in other sections, particularly in the oak forests of the plains where the timber of large size and high quality needed by industries like shipbuilding may not be grown by private owners.

Coupled with the laws restricting the freedom of the private owner in France to destroy his forest, is a series of constructive measures designed to promote the production of timber on private lands. Tax exemptions, in varying degrees, are extended to forest plantations during their first thirty years. The exemption is complete in the case of seeded or planted land on the slopes



BINDING FAGOTS OF BRUSH FOR USE AT THE FRONT

or summits of mountains, on sand dunes, and on land previously barren. If the planted land was under cultivation during the preceding decade, three fourths of the taxes are remitted. If the land has been fallow for ten years or more, it remains taxable but the assessed value of the bare land can not be increased for thirty years.

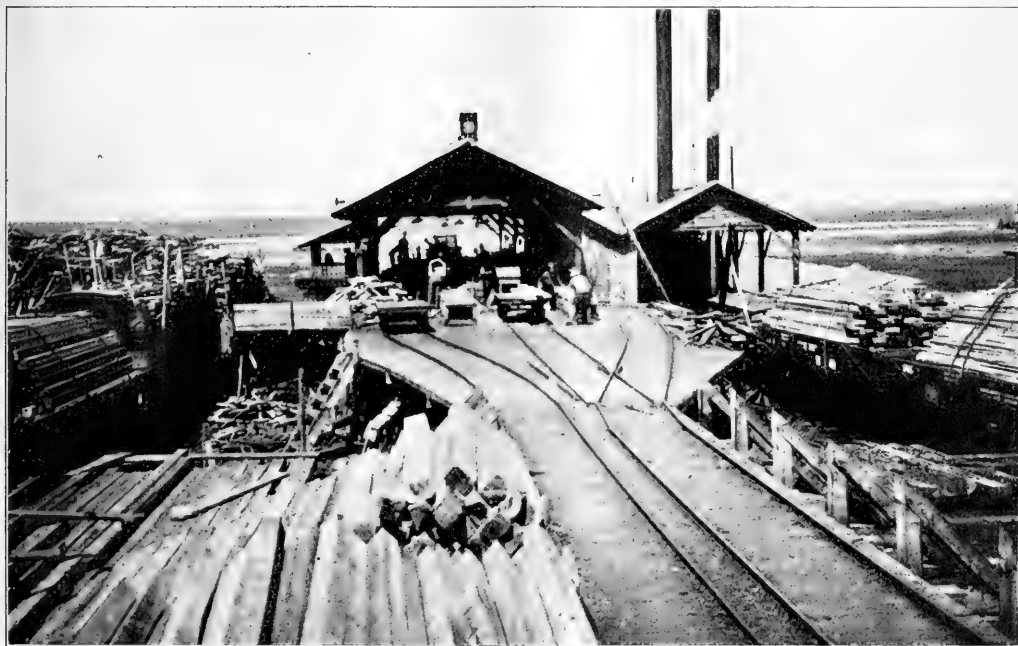
Other laws encourage the formation of local associations of forest owners for the joint administration of their properties. (The "syndicate" so common all over France for collective action in various enterprises). Such associations may extend from cooperative protection against fire or trespass to the complete management of timbered areas. And by a statute enacted in 1913 the services of the state foresters are offered to private owners or associations, at cost, in the protection or administration of their properties. Such measures, aiming to reduce the cost of technical management of timberlands, are especially adapted to the conditions in France, where timber values are high and forestry practice is general and well understood.

Private timberlands, in fact, comprise over two-thirds of the forest resources of France. 18.7 per cent of her

area is forested, or about 23,455,000 acres. The three million acres of state forests represent but 12 per cent of this total while another 20 per cent, owned by communes and other public agencies, is also under state administration. The rest is in private hands. The belief is common that the area of forests has been reduced below the minimum essential to sustained national prosperity and there is a strong demand in many quarters for extending the state forests, particularly in the mountain regions in connection with the checking of erosion and protection of water sources. But the results obtained by painstaking care in handling the limited resources of France are truly remarkable. Imagine a third of the population of the United States crowded into an area less than that of Texas and still supplying 70 per cent of their

at the outbreak of the war amounted to 100 board feet of lumber and half a cord of fuelwood from every acre of forest land in France.

This does not, however, tell the whole story of what France has accomplished in forest conservation. Due to the conservative temper of their race, forest owners, public and private alike, have not cut as much as they might; they have not used the full current revenue from their timber capital. They had accumulated a surplus by the outbreak of the war probably equal to four and a half billion feet, or twice the usual yearly cut. This surplus, together with the uniformly well-stocked and productive condition of their forest lands, was a prime element of national strength in the great struggle. The longer the 20th Engineers operated in France, the more



A MILL OF THE AMERICAN EXPEDITIONARY FORCE IN THE DUNES OF SOUTHWESTERN FRANCE

timber and all of their fuelwood from the current production of their forest lands.

Prior to the war, there were cut yearly from the forests of France 2,250,000,000 feet of timber and 4,670,000 cords of fuelwood. In addition to these amounts, some 400,000,000 feet of timber and 167,000 cords of fuel were obtained yearly from trees planted along roads and canals, from farm hedges, and from the plantations of poplar which are a common feature of farms throughout central and northern France. It is probable that France contained, in 1914, at least 150 billion feet of merchantable timber. The adequacy of her forest resources, however, was judged—not by the quantity of stumpage but by the current yield of forest land. The yearly cut

timber their scouts located. Our early conceptions of timber shortage in France were constantly revised upward. The enormous demands of the allied armies could have been met for one or two years longer without cutting seriously into the growing stock of the country.

The progress of France in forestry, like that of any other country, is of course an intimate phase of her own historical and economic evolution, the result of her peculiar physical conditions and the racial characteristics of her people. Its special interest to Americans lies in the fact that it is not a policy created by imperial edict—but the freely adopted regime of an intensively democratic and individualistic people. It would be futile to

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WHEN TREES GROW

BY PROF. J. S. ILLICK

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NOTHING about the numerous processes of trees is more readily comprehended than that they grow, for the results of growth are so obvious, and in some cases striking, particularly in temperate regions where annually a period of vegetative rest alternates with a period of vegetative activity.

The belief is prevalent that trees grow throughout the general growing or vegetative seasons, which embraces the middle states from 150 to 200 days, and extends from the last killing frost in the spring, that is, when the leaves of the larches, birches, cherries, and maples appear, to the first killing frost in the autumn when the leaves exhibit their autumnal coloration. This, however, is a mere supposition, for most of the native and introduced forest trees in the vicinity of Mont Alto, Pennsylvania, make ninety per cent of their height growth in less than forty days.

The following tabulation, based on data obtained in Pennsylvania, lists five representative species of forest trees, gives the date in spring when the growth of each

starts, indicates the percentage of the total growth of the season opposite specified dates, and schedules the progress, duration, and cessation of growth.

Not all forest trees begin to grow at the same time. Some start early in spring while others begin rather late.

The Wild Black Cherry, *Prunus serotina* is the first forest tree in the vicinity of Mont Alto to begin height growth. The elongation of its twigs starts about the fourth of April. The Domestic Cherry, *Prunus avium*, begins its growth about four days later than the native Wild Black Cherry. The Sweet Buckeye, *Aesculus octandra*, begins about April 6, White Pine, *Pinus Strobus*, about April 18, Tulip Tree, *Liriodendron*

Tulipifera, about April 25, and Norway Spruce, *Picea Abies*, about May 6. The date when the different species start the elongation of their twigs depends upon the inherent tendency of the species and the factors of the environment. The late opening of the buds of Norway Spruce is not a local characteristic, but an inherent tendency, for records from Germany show that they usually

DO YOU KNOW THAT

Trees make nine-tenths of their height growth in less than forty days?

Most trees start growing in April and stop growing in May or June?

Trees grow twice as much at night as during the day?

Some trees grow steadily during the growing time and others rest for days and then continue their growth?

That two rings may sometimes represent only one year's growth?



EUROPEAN LARCH IN FULL FOLIAGE

A coniferous tree which holds all its foliage each autumn. Lower buds begin to swell early, leaves emerge rapidly, but elongation of shoot does not begin until about the middle of May.



TERMINAL SPRAY OF PITCH PINE

Showing the original and the second growth of the season. Pictitious rings are regularly formed when a prolonged resting period occurs within the growing season.



LATE SPRING AWAKENING OF NORWAY SPRUCE

During early May the buds usually begin to swell. Elongation of the twigs begins at the base of the trees and proceeds upwards.

open after May 8, and in the extreme northern part after the end of May. On the other hand, factors of the environment, such as latitude, altitude, exposure, shade and shelter, also have a strong influence on the starting time of the season's growth. As a rule, buds open about two and one-half to three days later with each degree

	Wild Black Cherry	Sweet Buckeye	White Pine	Tulip Tree	Norway Spruce
Growth Starts	April 4th	April 6th	April 18th	April 25th	May 6th
April 15	7.5%	67.5%	00.0%	00.0%	00.0%
May 1	15.0	35.0	12.1	1.2	0.0
May 15	25.0	100.0	46.2	23.4	22.4
June 1	42.5		92.1	58.8	74.1
June 15	62.5		98.8	88.8	99.2
July 1	87.5		100.0	97.4	100.0
July 15	97.5			98.9	
August 1	100.0			100.0	

early part of June. Only a few species continue their growth into July. On June 10, 1919, I examined 79 different species of trees in the vicinity of Mont Alto, 55 of which, that is 70 per cent, had already ceased growing in height. On June 18 and 19, 1919, I examined 50 species of trees in the vicinity of Bedford, Pennsylvania, and found that the height growth of 40 had already stopped. This is an unusually high percentage of growth cessation, and is probably due to the extremely cold period during the early part of May, followed immediately by an unusually hot period during late May and early June. Such extreme temperatures and the abrupt transition from one extreme to the other are potent factors in retarding growth and in extreme cases may cause entire cessation of growth. The White Pine, which usually stops growing in the vicinity of Mont Alto about June 15, but may continue to grow as late as June 30, ceased growing this year (1919) about June 3. It is the writer's belief that 85 per cent of the forest trees of Pennsylvania have already (June 20, 1919) completed their normal height growth for the season. Of the remaining 15 per cent of the Tulip Tree, Sycamore, and the Larches are prominent species, which may continue to grow until the middle or latter part of July. By the

of latitude and about two to two and one-half days later with each 350 feet of altitude. White oak begins its growth from seven to fourteen days later on northern than on southern exposures on the Mont Alto State Forest. Trees with small and partially or completely imbedded buds such as Honey Locust, Black Locust, Kentucky Coffee-Tree, Tree of Heaven, and Catalpa, begin growth relatively late. Nature seems to protect the tender growing points of these trees from the cold of winter by placing them within small buds which are almost completely imbedded within the twigs. This means of adaptation also protects the tender new growth of spring from late frosts, for the small and deeply imbedded buds are not stimulated so early in spring as large exposed buds; hence, the resultant vegetative growth usually appears after the damaging frost period.

Pennsylvania is the meeting ground of many northern and southern forest tree species. The northern follow the mountains towards the south and the southern extend northward through the valleys. The distinctly southern species, which are decidedly sensitive to spring frosts, as a rule, begin the elongation of their shoots rather late, that is, after the danger period of frost damage is past. The Eastern Catalpa, supposedly a native of the South Atlantic States, does not leaf out until the latter part of May. Likewise other southern species, such as Persimmon, Kentucky Coffee-Tree, and Bald Cypress postpone the beginning of their vegetative elongation until late spring.

The range of the period during which the height growth of forest trees ceases is longer than that during which height growth starts in the spring. The Sweet Buckeye, *Aesculus octandra*, usually completes its growth at Mont Alto as early as May 10 to May 15, and by June 15 one can find full-sized winter buds. This species is the first to complete its height growth of the season. Most species of forest trees in southern Pennsylvania cease growing during the latter part of May and the



THE WHITE OAK MAY TAKE A REST

The large fully developed leaves are the result of the original growth of the season. After resting for 20 days, growth was resumed, and the terminal shoot bearing immature leaves is the result.

first of August the normal height growth of all the forest trees of Pennsylvania has, as a rule, ceased.

In order to determine the progress of the height growth each species must be examined by itself, for each individual species possess distinctive inherent growth characteristics. Some place their growth without a break, while

others place it by leaps and bounds alternating with rest periods. In this respect the method of working followed by trees, and growth surely is work, differs little from the methods of other organisms, including man. Rarely does any organism work continuously, but rest periods are usually, and sometimes frequently, interspersed between the periods of work. Rest periods, however, should not be regarded as synonymous with idleness, for



JUST BEFORE HEIGHT GROWTH STOPS

The twigs of Norway Spruce take a decidedly drooping position for a few days just prior to the cessation of height growth.

they are normal prerequisites to the optimum functioning of all organisms. Without them no organism can attain optimum efficiency nor maintain health.

Few comprehensive statements can be made regarding the growth behavior of forest trees during the growing season. There is wide divergence between the height growth behavior of Wild Black Cherry, Sweet Buckeye, White Pine, Tulip Tree, and Norway Spruce. Yet, in spite of this wide divergence the fundamental features of the growth procedure throughout the growing season may be summarized as follows: *Growth begins slowly, after a variable period rises rapidly, then reaches a maximum which is maintained for a short while, finally falls gradually to a minimum, and then ceases completely.*

The actual growth is, however, less regular than charts indicate, for the rate of growth usually exhibits a certain rhythm or periodicity. It progresses by leaps and bounds alternating with rest periods, which may be of long or short duration. Rest periods of short duration occur

frequently and at irregular intervals, but are hard to detect with instruments of ordinary precision. Rest periods of longer duration are also common and readily measurable.

The height growth of a Chestnut Oak, *Quercus Prinus*, tree during the 1918 growing season showed the terminal shoot started to grow on April 17 and continued its elongation until May 23, when the first upward thrust ceased. A resting period of 24 days followed and on June 16 growth was again resumed and continued until July 13, a period of 27 days. The first growing period extended over 34 days during which the terminal shoot elongated a total of 10 inches, that is an average of approximately one-third of an inch per day. This was followed by a cessation of growth for 24 days when the second and final elongation of the season began. The second growing period extended over only 27 days during which the terminal shoot elongated a total of 13.5 inches, that is an average of one-half an inch per day. Such a periodicity of growth is not unusual, but rather peculiar to



TAKING A DAILY MEASUREMENT OF GROWTH

The terminal twig of Norway Spruce is the last to begin its elongation, but by the end of the growing season it exceeded all others in length. Some trees grow in height more than one-inch each day during the grand period of growth.

certain species. Pin Oak, Black Oak, Chestnut Oak, and Pitch Pine frequently begin to place a second growth to to 25 days after the original growth of the season has ceased.

The period during spring and summer when height growth does not progress may be regarded as a *resting period*, a *recuperative period*, or a *period of preparation*.

The trees apparently rest but in reality they are preparing for the next upward thrust which may be longer than the original advance. Furthermore, the writer believes that the recurring rest periods may become a rather fixed and regular feature of the growth of certain species. This is certainly true in the case of normal young Pitch Pine in the vicinity of Mont Alto which exhibits annually



AFTER HEIGHT GROWTH HAS CEASED

Immediately following the completion of height growth the twigs of Norway Spruce assume an erect position, begin to stiffen, and develop winter buds.

a cessation of growth for a period of two to three weeks.

The rate of tree growth not only fluctuates throughout the growing season but also during each day. The maximum growth usually occurs late at night, apparently after the preparation and translocation of food and other essential materials becomes less active, and the minimum growth falls in the afternoon of each clear day when the greatest activity in the manufacture of starch and sugar is in operation.

About 20 trees of each of the four species given in the following tabulation were measured regularly at 7.30 P. M. and 7.30 A. M. for a specified period. The derived results for growth during the day and at night are given in the following tabulation:

SPECIES	DAY	NIGHT
Tree of Heaven.....	35%	65%
Tulip Tree.....	40%	60%
Norway Spruce.....	18%	82%
White Pine.....	39%	61%
Average	33%	67%

This tabulation shows that trees grow about twice as much at night as during the day. By using instruments of greater precision the percentages would no doubt be changed somewhat, but the general comparative rate of growth would still stand unchanged.

To some persons it may appear that the problem of growth behavior of trees has only an academic application. This point of view is, however, untenable for there is an economic side to the study. If conducted in a scientific manner it will supply the basic data for the preparation of a rational schedule for transplanting in the nursery and setting out trees in the woodlot and forest. Foresters, silviculturists, and plant physiologists recommend that planting and transplanting operations should be conducted when the material to be planted is in a dormant condition. No fault can be found with their recommendation, but in order to execute it properly one must know when trees really are dormant. This can



A "DOUBLE-HEADER" OF HEIGHT GROWTH OF CHESTNUT OAK

Height growth often proceeds by leaps separated by rest periods of variable duration. The original growth of the season bears mature leaves, while the second period of growth is characterized by a sparse setting of immature leaves.

be ascertained best by determining when trees grow, since growth is so evident and measurable, and whenever trees are not growing they are dormant, that is, in a static condition, the duration of which is hard to determine.

Furthermore, such a study facilitates the preparation of a schedule for field work covering the problem of growth. That determination of the quantitative and

qualitative growth on cut-over lands is one of the most important and urgent problems in American forestry is conceded by the most authoritative foresters. This is one of the four major problems which the chairman of the forestry committee in the Division of Biology and Agriculture of the National Research Council recommends as worthy of immediate and thorough consideration. Heretofore, we have generally been instructed that the height growth of the season cannot be accurately ascertained until late in fall or during the winter months when the weather is relatively unfavorable for field work and the days rather short. Consequently, it now follows that since trees actually cease growing in height in May or June, no reasonable exceptions can henceforth be filed against the collection of height growth data immediately after the cessation of growth in summer.

It should be understood, however, that the problem WHEN TREES GROW is but a prelude to the major problem, which is far more comprehensive, and includes also a study of diameter and volume growth of the stem and the growth of roots, all of which should be undertaken; for the results derived therefrom would be of great economic value.

A knowledge of WHEN TREES GROW also aids in the determination of the best time to peel bark. Bark can be peeled satisfactorily only when the sap is abundant and active. Briefly, the bark peeling season coincides with the growing season of trees, even to the extent that lumbermen recognize a "second sap" period during June in Chestnut Oak trees. This furnishes practical proof that the second period of growth recurs rather regularly in this species. The second period is usually short and the bark does not peel so satisfactorily as in the first period of the season. It is, therefore, recommendable that the period of active growth be accurately determined

for each species, the bark of which is peeled, in order to determine the exact limits of bark peeling season.

A thorough study of the growth of trees will also furnish much-needed information to the legal profession. Many legal decisions concerning boundaries and titles hinge on the question whether each growth ring represents the growth of one season, or if fictitious rings are sometimes formed. The writer examined a large number of Pitch Pines and Chestnut Oak trees and found that fictitious rings are regularly formed when a prolonged

resting period occurs within the growing season. Hence, in some cases two rings represent the growth of a season, instead of one annual ring.

The problem—WHEN TREES GROW is not only of technical interest and economic value but might be used as a means of developing real tree appreciation among the children of our public schools. The best soil in which to plant love for trees is the heart of childhood and womanhood. The present lack of a fuller appreciation and a more compelling warmth towards the out-of-doors in which we daily move and often toil is largely due to the kind of education practiced in the past and still retained in a few ultra-conservative communities. It is pedagogically criminal to instruct the boys and girls of the United States concerning the Eucalyptus trees



THE OLD AND THE NEW

Not an evergreen tree decorated with candles but a Pitch Pine with its characteristic erect new growth.

of Australia, the Big Trees of California, the Yew trees of England, and the Cypress trees of the South without mentioning the White Oak, Chestnut, Tulip tree or White Pine which may stand near the schoolhouse door. And merely to mention the names of these trees is not sufficient. This simply serves as an introduction, but if the children are also instructed concerning their growth and other activities they begin really to know these trees, and will continue to observe and study their habits.

**WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE
THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.**

CENTRAL PARK TREES STARVING TO DEATH

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

TREES in Central Park, New York City, are starving to death. Four thousand or more have died since 1917. Three thousand of the dead have already been removed, the others will be taken out in the next few months. Hundreds are dying now and many of them may be considered a total loss. Some of the weak and sick are to be given special treatment in the endeavor to save them and they may be saved.

Various causes contribute to the present deplorable condition of the trees in this famous park of the largest city in the United States, causes which in one way or

selection of species for planting, and methods for bettering conditions of the unhealthy trees which remain standing, and their report indicates that much can be done to improve the situation.

Park Commissioner Francis D. Gallatin and City Forester J. S. Kaplan have, for several months, been closely studying the causes which result in the failure of certain species of trees to thrive and they have already adopted measures to improve soil conditions and provide the trees with more nourishment. This will undoubtedly be effective in many instances but it will not be thoroughly effective



DEAD WHITE ASH

An example of the effect of hard packing of the soil about the roots, dense grass sod, and full exposure to sun and wind. This tree is near 72nd Street and 8th Avenue and by proper care could doubtless have been saved.



NOURISHMENT LACKING

A typical surface soil condition along Fifth Avenue. Note the shallow spreading root system and hard packed soil about the base of the tree, one of the conditions which lead to the starvation of the park trees.



DEAD LINDEN

This tree of fine dimensions was killed by the bad surface soil conditions. This part of the park is often thrown open to children and other visitors for play and the earth is hard packed wherever it is not grass coated.

another affect tree growth in a great many city parks throughout the country. What has happened in Central Park may happen in many other parks, and the measures being taken to save the stricken trees which remain should be carefully studied by park commissioners and city foresters of other cities in order to aid them in overcoming similar conditions which may exist under their jurisdiction.

The American Forestry Association engaged two expert foresters to make a careful examination of the trees in Central Park, the soil and the climatic conditions, the

tive because of the fact that some species of trees, planted many years ago, are not suited to withstand the hardships which they encounter in the park. The relief measures will aid them, but, perhaps, only temporarily, while permanent relief may be obtained only by the removal of such species as will not thrive and their replacement with trees so hardy that they will withstand both the soil and climatic conditions which make careful selection of species and great care of those selected imperative.

There are some 60,000 trees in the park and about 4,000 of them were killed during the Garfield winter,

1917-1918. While the cold was severe, zero weather continuing for a long period, the trees which died would, in the large majority, have withstood the winter had they not been weakened by long years of malnutrition.

The chief handicap which species with a deep root system have to face is the fact that the soil in Central Park is only from two to five feet deep and that at a depth of five feet there is a heavy clay which the roots cannot penetrate. Consequently, when a tree reaches an age at which its roots should go deeper than five feet the clay prevents penetration and the trees lack sustenance.

In many cases the experts making the examination for AMERICAN FORESTRY found that trees would be greatly aided by the earth at their base being broken up. Numbers of trees were being choked by the hard earth cover-

poplars, fourth, the lindens and last, the maples and several other species.

There are a great many varieties of trees suitable to park planting and practically all of them vary in some way from each other in their requirements of soil, moisture, etc. Let us look over several species commonly found in Central Park in regard to their soil and moisture requirements. Take the elms. In general, the elm is one of the species found most often in Central Park. It is used on the outer edge to shade the walks surrounding the park, on the Mall, and often is met with throughout the interior. Many of them are rapidly approaching death. The once famous cathedral aisles of elms along the Mall have gone entirely, and along the borders of the parks on Fifth Avenue, Eighth Avenue and the two end



DYING TULIP

The soil about this tree was packed hard by the constant playing of children and the grass kept using up the soil moisture beyond the bare ground. The tree is slowly dying.



DEFOLIATED BEECH

This 22-inch tree was an out-crop of rock. The soil packed hard and exposed to full sunlight about the roots makes it impossible for the tree to thrive.



A YELLOW PINE

This tree suffered from a shallow soil, a windy site, and exposure of the soil to direct rays of the sun. The result is stunted development and early death.

ing their roots or by heavy grass growth close around them decreasing their nourishment.

Climatic changes, smoke and dust also undoubtedly adversely affected the trees but these are conditions which cannot be overcome and trees hardly enough to cope with them should be planted whenever new planting is undertaken.

DEAD AND DAMAGED.

Of the 3,000,000 trees removed in the last two years the greater number were Oriental plane trees which had been frost cracked and killed by the 13 degrees below zero weather of the Garfield winter. Next in number of dead were the elms, then came the oaks and Lombardy

streets of the park one can scarcely find an elm of healthy appearance. The other species of elm have apparently withstood the strain better but they, too, are seldom to be found in strikingly vigorous condition.

Being so much used, the elms' ability to endure the very trying conditions in Central Park is of great importance. Let us see what the requirements of the elm are for best development. A well known authority upon dendrology writes of the elm: "It never occurs (naturally) on dry upland (on account of root habit). In the juvenile stage the root is shallow and spreading, rarely reaching a greater depth than three feet six inches the first year, while the shoot may be twice as long. A

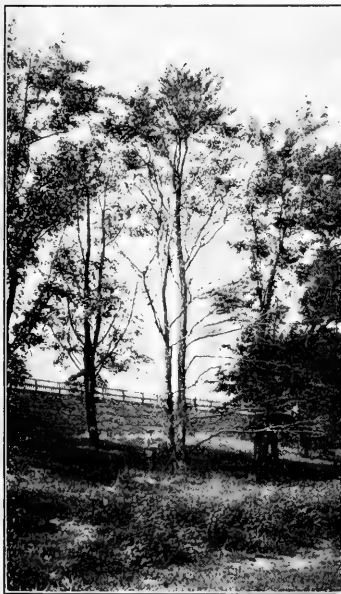
typical swamp type. At maturity the root system is wholly superficial, rarely penetrating the soil to a greater depth than two and one-half feet. The tree attains its largest size and best proportions on deep, moist, fertile bottomlands. It does particularly well on fine silt and clay lands that retain the moisture in the surface layers, so that till soils and uplands soil that retain moisture in the surface layers will support this tree. The soil is not important where the moisture conditions are suitable." From this it can be seen that the elms are able to grow well in Central Park, but it is not as a whole a very good site for it, much of it being upland and not too well watered. The elms growing there, therefore, would be living nearer the boundary line between sickness and health that would be the case with some other species, and a sudden succession of changes in growing conditions or

found entirely defoliated but frequently thin crowns are apparent. English oak, red oak and scarlet oak were found in excellent condition although some showed signs of deterioration by being staggy-headed, *i. e.*, with dead tops.

The beech is another heavy sufferer. In fact if anything it has suffered even more severely than the elm, only not being plentiful it strikes the attention less. The beech does best on a deep, rich soil, but any soil with plenty of moisture in the central layers will maintain it.

The Oriental plane tree, or sycamore, is a common tree in Central Park, and an excellent one for such planting, being bothered by very few insect or fungus attacks, and being very hardy. It is badly injured by severe frost, however.

The lindens are often to be seen in the park, but are not



ALMOST DEFOLIATED BEECH

Note thick grass about the tree and the exposure to the full light of the sun from the direction of the camera—the southeast—where the chief sunlight comes from resulting in the depleted vitality of the tree.



DEAD ELM, FINE OAK

The elm is in typically "park" conditions, open to the sun and wind and with grass about the roots. The pin oak has half of its roots protected from sun and wind by the natural undergrowth of the forest.



POOR AUSTRIAN PINES

In general none of the evergreens do very well in the trying conditions of Central Park. Note the short tree in the dense grass. No really fine and strong Austrian pine was found in the park.

attacks from insects or fungus enemies would have a very severe effect upon them.

Another very common tree is the pin oak. To quote from the Manual of the Trees of North America, by Sargent: "Borders of swamps and riverbottoms in deep, moist, rich soil" are the sites best suited to this tree. It is self-evident to anyone who knows Central Park that the pin oak will only occasionally find such sites in Central Park. This tree also, then—as situated in much of Central Park, must be growing under a handicap and therefore will be more easily injured by changed or injurious conditions. At the present time it is seldom

as hardy under city conditions as a number of other trees, requiring for best development a deep, rich, fertile, moist soil. It is also much subject to insect attacks.

The Catalpas are trees of great vigor of growth, and are often met with in Central Park. They also do best on a deep, rich, moist soil, but having deeply penetrating, wide spreading root systems, they are less affected by surface drying of the soil than many other species.

One of the most beautiful of all the trees in Central Park is the tulip tree or yellow poplar. Growing to a great height and with deep, wide spreading roots, it will do splendidly on soils that are not too shallow and which



DEAD TREES AT SOUTHERN END OF THE RAMBLE

On this slope, which was made up of a fairly heavy clay soil with rocky outcrops nearby, there were dead buckeyes, red maple, tulip tree, and pin oaks, all of about the same size and pretty close together. Note the tops of the dead trees against the sky.

are not too dry. Its best growth is on rich, fertile, deep soil.

A tree with much the same kind of root system as the tulip is the cucumber tree. Naturally the species is only found on deep, moist soils, and when so placed grows into a tree of large size and great beauty. It is found in several places in Central Park.

The silver maple is very common but is a poor tree on account of the brittleness of the wood, being often badly injured by winter storms. It is a poor tree to plant, but a number of them are found in Central Park.

Another common species of tree often met with in Central Park is the Norway maple. This is a species from Europe and is the most hardy and most resistant of all the maples for city planting. It should, therefore, do well in Central Park.

There are a number of hard maples in the park, and they make a handsome ornamental tree. The species requires for its best growth plenty of moisture in the surface soil and preferably a great deal of humus in the soil also.



FINE ELM STRANGLED BY THE SIDEWALK

The space about the trunk is only about two and one-half feet wide, and the asphalt sidewalk and drive have smothered the roots. This fine old tree is on the corner of 59th Street and 5th Avenue, and, with proper treatment, would have been a fine shade tree for many years to come.

The red maple which is common in Central Park is really a bottomland tree; at least, it grows best in moist, even in wet soils, although it also is found on uplands. It is apt to suffer from lack of moisture when planted away from streams or lakes.

Horse chestnuts and buckeyes are very frequently encountered in Central Park. Their natural site is along streams and on rich bottomlands with plenty of moisture in the soil. They are living under a strain whenever they are planted on dry sites.

The honey locust and the black locust, also found in the park, are both trees with deep, wide spreading roots, and able to grow on a great variety of soils, the latter being especially able to stand very hard

conditions. For the best development, however, they both need deep, fertile, moist soil.

Scattered occasionally through the park are the botanical freak trees called the Ginkgo or Maiden Hair tree. This species comes from China and is in America entirely free from all enemies and fungus or insect world. It is very hardy and will



ALL THAT IS LEFT OF THE FAMOUS CATHEDRAL AISLES OF ELMS ALONG THE MALL

The young elms on the right without foliage are recently planted, and should come out in one or two years like the small elms on the extreme right. But the condition of the large elms on the left—which have not reached the age limit for this tree makes the planting of more of the same species on the same site open to question.



A CLUMP OF WHITE PINES

Shallow soil—a rocky outcrop was only about 75 feet away—exposure to wind and to the direct rays of the sun, no shading of the ground under the trees, all work together with the dust-laden air of the city to stunt and kill these trees which are capable of making splendid growth on a favorable site.

grow well almost anywhere. It is a very striking tree in general appearance, and one of the best of city trees.

Another exotic species is the Ailanthus, or Tree of Heaven, also from China. Like the Ginkgo, this species is very hardy and will thrive where most other species would die. It is even more hardy than the Ginkgo, and is doing well in the park.

The wild black cherry is very commonly found in Central Park, especially in the northern portion on the forested sections. It will grow on many varieties of soil, and the moisture conditions are not exacting, but they must be uniform for the tree to attain large size.

The white ash is also a common tree in Central Park and its crown is frequently thin owing to the hard conditions it has to face. It is a tree which is rather exacting in moisture requirements, but will reach large size when it is on a well-watered, porous soil.

The common cottonwood often encountered in Central Park is another tree with a good deal of capacity for standing city conditions as long as it has



WHERE HEAVY CLAY HINDERS TREE GROWTH

About this little drinking fountain the soil is a very heavy clay—almost like putty. This has been the means of the death of the three trees in the background. The tree on the right has been killed by the placing of an asphalt walk right up to it on one side and from appearances to within a foot or so on the other.

plenty of moisture in the surface soil. Its soil requirements are much less important than its moisture demands.

Of the evergreens, none do really well in the dust and bad air of the city, while of the pines, the white pine is often found in Central Park, but it needs abundant and constant moisture in order to attain to its best growth.

The Austrian pine is another frequent factor in the make-up of Central Park scenery. It is hardy and can withstand city conditions fairly well, although, of course, influenced by them to some extent, and is not as healthy in Central Park as it should be.

These species of trees are in general the principal trees met with in Central Park. Now, let us examine the park

and see what success has been made in growing them there. Taking them in order of their resistance to hard conditions:

The elm is in a class by itself and how it has suffered is told in a previous paragraph.

The beech, not so plentiful as the elm, has perhaps been more injured than any other species in the park.

Next in order come the red maple, and the lin-



THE ELMS ALONG FIFTH AVENUE

This picture was taken in the second week in September. Note the loss of foliage and the hard packed soil around the base of the trees. There was little or nothing to shade the soil about these trees from the sun.

den. These two trees were rarely found to be in good condition and often were found partially if not wholly defoliated.

A group of four species comes in at this place in the list, tulip, pin oak, white ash, Austrian pine. They were seldom found entirely defoliated but frequently their crowns were very thin. The tulip poplar sometimes had fine form but with small, poor foliage.

Another group contains cottonwood, English oak, red oak, scarlet oak and sycamore, and these in many cases showed signs of deterioration by having dead tops, although many are still in good condition.

Sometimes the soil will be badly drained and will tend to collect and hold too much moisture, having the tendency to smother the roots of the trees by shutting off all air. Then again, the soil may be shallow and will, therefore, tend to dry out very quickly, thus leaving the trees without water. Then the condition of the sub-soil may make a great difference in the tree growth. If the sub-soil is very heavy and impermeable to water and to the roots of trees, it will greatly impede tree growth if it is too close to the surface, or it prevents moisture from coming up from below into the surface soil. Under such conditions breaking up the sub-soil with dynamite



THE WHITE BIRCH

Nowhere is the European white birch found really doing well in Central Park and here it had splendid forest floor conditions with plenty of shade and humus, but it did not thrive despite these.



FAST FALLING ELMS

American elm near 59th Street, 15 inches in diameter and planted on an east slope where the full effect of the sun on the ground will be felt most. Note the dense cover of grass about the roots of the tree.



POOR RED MAPLES

This tree was nearly defoliated. The soil was very shallow and there was a large, rocky outcrop just to the left of the picture. Many of the other red maples in the park are like this one.

The last class of all, containing trees which showed little or no sign of any kind of having suffered contained the Ailanthus, Gingko, cucumber, Norway maple, Catalpa.

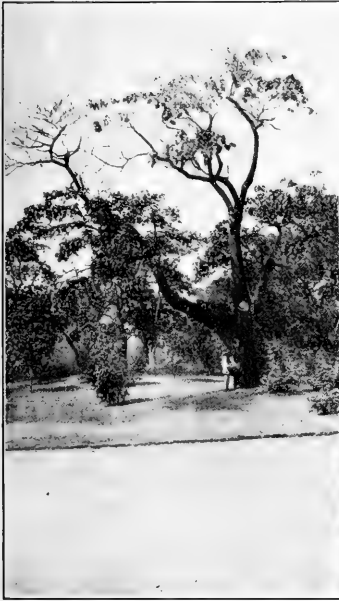
DEPLORABLE SOIL CONDITIONS.

Soil conditions in Central Park are undoubtedly the most severe handicap to the health of the trees. Most common trees desire a fairly deep, well-drained loamy soil with plenty of humus (decayed vegetable matter) mixed in with it, especially in the surface layer of three to six inches. If too loose and sandy the rain water will soon drain off and leave the trees waterless, and if the soil is too heavy, like a fine dense clay, the water falling on it will tend to form pools on the surface and evaporate and be lost to the trees that way. Also a heavy clay soil will tend to interfere with the growth of the roots.

has been proved to be effective. Again, hard packing of the surface soil by people walking upon it, covering the soil with cement or asphalt walks or roads will tend to impede tree growth. Now, many of these difficulties and hindrances to tree growth exist in Central Park today. Shallow soil is very common, often only a few inches covering up the rock below. Heavy impermeable clay is also present in places. A hard packing of the soil around the bases of the trees is quite noticeable along Fifth Avenue. And exposure of the soil to evaporating winds and to the direct rays of the sun is everywhere common. Add to this the frequent proximity of asphalt walks and drives and the frequency of a dense sod of grass growing under the trees, and it is easy to see how difficult it is for a tree to secure normally good soil conditions in Central Park.

Now it has been the duty of officials of the Park Department ever since it was organized to know these things, to realize the handicaps with which the trees have had to contend and to take measures to overcome these handicaps. That this has not been done by the Park Department officials in the past is evident by the condition of the trees today and the difficulties with which the present Park Department officials have to contend. The trees would be in much better condition had they been properly nourished. They should have been carefully and skillfully fertilized, the shallow soil could have been enriched year after year and if it had been, the trees would have been hardier, stronger and better able to withstand the rigors of the Garfield winter as well as the climatic changes of the past few years.

in its annual report for 1919, which said, "The New York City parks bear very noticeable marks of the exceptionally cold winter, 1917-1918. In the spring of 1918 it was observed that many trees and plantations failed to put forth their leaves, and as the season advanced it was found that they had died either from the intensely cold winter or from cold weather and weakened condition due to disease. The great privet plantations along Park Avenue, some of them fifteen years old, were practically destroyed. The privet hedge around Claremont Inn on Riverside Drive had to be cut back to within a foot of the ground or entirely replaced. All over the city the privet showed damage in various degrees and it is estimated that the loss of this ornamental shrub alone amounted to \$75,000.



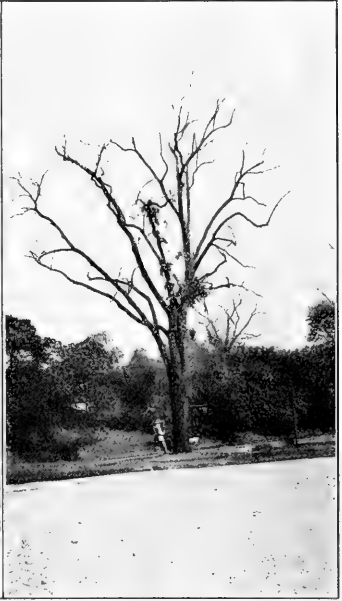
A DYING CATALPA

This very large and picturesque catalpa is old and the open situation, grass and exposure to wind and sun is proving too much for it. It will probably last but a few more years.



A TYPICAL TULIP

Note the small size of the leaves, the soil packed around the base of the tree by the visitors and the grass on all sides. The foliage of a healthy tulip is much larger.



A BLACK WALNUT

Standing on the top of a steep rise, surrounded with heavy grass soil and exposed to the full sunlight and wind, the soil conditions for this large American black walnut are very bad.

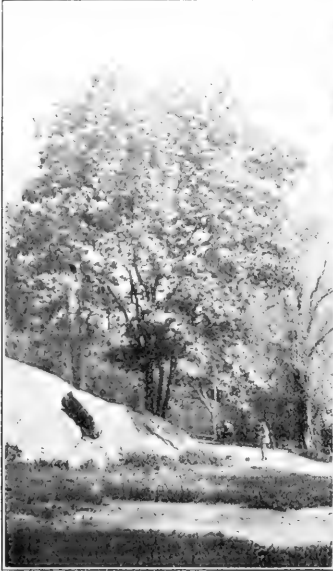
Even the elms, now so pitiful in appearance, could have been given such care, that they would have thrived even under the adverse conditions which they had to face. They have done well in other cities and in other parks where the soil is just as shallow and where they had many difficulties to overcome and they did well because they were given plenty of individual attention.

It is essential in park management that the Park Commissioners and the City Forester should be absolutely free from political influence and should be provided with sufficient funds to do their work well. Political forestry cannot be successful.

Attention was given to the tree losses of the park by the American Scenic and Historic Preservation Society

"Next to the privet the greatest sufferer was the plane tree, or Oriental sycamore. This tree was particularly free from pests and was planted in the belief that it would be immune from winter killing. These trees were largely in the streets where their loss is particularly grievous as it is hard to make trees grow in New York streets on account of pavement, gas leakage, damage by automobiles, etc.

"Other trees which were killed included turkey oaks, horse chestnuts and lindens. In Central Park there were perhaps 400 turkey oaks, 5,000 lindens and 3,000 horse chestnuts. These trees fell easy victims to the weather for they had been defoliated and their vitality sapped for three years in succession by the tussock moth.



TWO FINE HICKORIES

In the northern part of the park there is a good deal of natural forest growth and while some of the trees there have died most of them are doing well. These hickories, as is apparent, have taken hold finely.



HEALTHY RED OAK

The soil about this tree on the West Drive was loose and untramped down. The small fence has had a tendency to keep the people on to the walk. The grass would be better absent from under the tree.



FINE HONEY LOCUST

The honey locust seems to do very well in the park even when the site conditions are not ideal. It would be a good thing to plant more of them, even if they are difficult to prune on account of the thorns.

"The one tree of all the nursery-grown trees in the park that seems to have suffered no damage is the Ginkgo. Not one has been found to be killed and few have frost cracks. Even the solitary Ginkgo planted by Li Hung Chang at General Grant's tomb, which is one of the most exposed places in the city, weathered the winter without harm, while the bladdernut tree, planted by the same personage at the same time, immediately adjacent to the park, was all but destroyed.

"In January, 1919, Commissioner Berolzheimer announced that over 3,000 dead trees had been removed in his jurisdiction up to that time."

RELIEF MEASURES ADOPTED.

The Department of Parks makes the following announcement regarding the situation: "Park Commissioner Gallatin has announced, as a result of extensive investigations, a definite programme for the restoration and stimulation of the trees in Central Park.

"Through the acquisition of a 'K' machine for pulling dead trees and stumps out of the ground, it has been found that the basic trouble with the trees in Central Park is the fact that the native sub-soil is of a stiff impenetrable clay, and that the reason trees die after they grow to be about one or two feet in diameter, is because of the inability of the roots to secure nourishment after they reach this clay sub-soil.

"It is very fortunate that we were able to secure a hand-power pulling machine, which made it possible to tear out stumps practically intact, as it discloses this condition very frankly. This situation was known to the

planners and builders of Central Park as very frequently in the removal of a stump of this nature, earthen pipes of two inches in diameter are found, which were placed both horizontally and vertically through the clay, and occasionally a large group of boulders was piled immediately under the newly planted tree, designed probably for the purpose of breaking up the clay so that the roots could firmly establish themselves.

"It is the opinion of Forester J. S. Kaplan that unless something is done to remedy this situation, it will never be possible to grow trees larger than from two to three feet in diameter in Central Park.

"Commissioner Gallatin has concluded that sub-surface blasting is the remedy most likely to be successful and most easily and cheaply to be tried.

"As a result of a conference with representatives of the DuPont Powder Company, arrangements have been made to take one lawn in the lower end of Central Park for experiments in this direction. Holes will be drilled about 18 feet apart, and a light charge of dynamite placed in each hole with the object of shattering this cementations sub-surface clay.

"This practice has been successfully carried out among orchardists elsewhere, and it is highly probable that marked results will ensue from this treatment. This work is to proceed immediately after the leaves fall this year. It is also intended to plant several trees on this lawn in blasted holes.

"If this experiment proves successful it is Commissioner Gallatin's intention to request sufficient money to treat practically all of Central Park in the same way."



A HEALTHY PIN OAK

Note the bushes which shelter the soil about part of this fine young pin oak in the Ramble from the direct rays of the sun. This helps very much in making the tree strong and vigorous as readily seen.



A SPLENDID COTTONWOOD

The cottonwood is a river bottom tree and here close to the Swanboat Pond it has shown its capacity to develop into a beautiful ornament for the park. It is, undoubtedly, an ideal site for this species.



VIGOROUS ENGLISH ELM

The English elm stands the conditions of the park better than the American elm. This tree had very good site conditions for it had been cultivated about the roots which were shaded by rhododendrons.

THE EXPERTS' OPINION.

The experts report to AMERICAN FORESTRY that under the head of unfavorable soil conditions they have found in Central Park shallow soil, heavy impermeable clay and hard packing of soil around trees.

Under the head of species especially sensitive to the Central Park conditions they have found elm, beech, red maple and linden.

Trees which will make fair growth in Central Park under specially favorable conditions there they have found to be tulip, pin oak and white ash.

Trees that have demonstrated their ability to do really well in many sections of the park, they have found to be cottonwood, English oak, red oak, scarlet oak and sycamore.

For practically any sites in the park, even the unfavorable places, either the Ailanthus or Ginkgo can be always counted upon.

The cucumber, Norway maple and Catalpa will all grow splendidly when on their proper sites in the park. Off of their proper sites they will not do so well there.

In regard to meteorological conditions influencing trees during the last twenty years it is clear that:

1. There has been a decided decrease in rainfall.
2. Much of this decrease has been in the summer months when needed most.
3. There has been a decided decrease in relative humidity in the past five years.
4. There has been an increase in the wind movement in the past five years.

5. The trees have been subjected to a very severe frost in the winter of 1917-1918.

With all of these factors before us it is only natural to seek to come to some conclusion as to what the cause of the present situation of the park is and from that to reach out for a solution. Briefly the conclusion as to the cause of the present situation of Central Park, is that no one single, but a combination of causes all detrimental to the successful maintenance of Central Park trees are operating. None of these conditions alone would entirely bring about the present situation and therefore the changing of any one will not cure it entirely. All must be taken into consideration and all must be worked upon.

THE CONCLUSION.

The conclusions reached by the experts follow:

1. Selection of only such species of trees for planting as have proved either entirely hardy under present conditions or at least have done well on certain special sites in the park. This, of course, applies only to the planting of trees on a large scale, specimens of arboricultural interest being entirely another matter.

2. Special attention to the establishment and maintenance of proper surface soil conditions under the trees. It is the soil-moisture conditions of the trees which is the one great thing to watch out for in dealing with trees anywhere and especially in a park where the trees are planted singly and are exposed to severe drying conditions of the surface soil around them. The establishment and maintenance of proper conditions for preserving soil-moisture in Central Park might entail:

(a). Cultivation of soil around all trees of special interest or value, and the more the better.

(b). Mulching or covering the soil about the trees with manure, dead leaves, etc., during the winter.

(c). Planting trees in small groves or "woodlets" and keeping them in the form of small patches of natural forest (leaving the leaves and small twigs to decay on the ground and so form a natural mulch).

(d). Underplanting the larger trees with more shade enduring species which would shade the ground, protect from wind and so prevent drying out.

These suggestions would perhaps cost a great deal of money or a change in the principal present-day policy of the park management but is not the end worthy of such expense and change? To anyone passing through the park on any bright day in the warmer months the value to human life—especially child life—of the open, outdoor stretches of natural growth, so different from the narrow, dirty, noisy streets in which most of the park visitors were born and now live, is ample to warrant a great increase in expenditure by the city to save and energetically maintain the tree growth within this, the

most famous of all American city parks. At the present time and under the present system many of the trees of the park are much retarded in growth and a large number have died. Some of these latter have been of large size and fair age, but it is clear to the careful observer that practically all of them should have lived for a good many years longer and there is good reason to believe that if proper care and enough money had been devoted to them, they would still be shading the walks and lawns instead of going to the woodpile. Now, when too late the trees are dead and the expense of taking them out and planting new ones comes up, while the public waits for years for the new tree to attain good enough proportions to fill the blank left by the dead specimen.

The situation confronting New York as a result of these findings will, perhaps, fit many other cities in the United States. We have all seen beautiful trees "just die" and the layman is at a loss to understand why they should. The New York park officials are alive to the situation, and are trying to improve it while knowledge of just what is best suited to Central Park conditions is of the utmost value to every city forester and park department official.

PLANT MEMORIAL TREES FOR OUR HEROIC DEAD



THE NORWAY MAPLE

This tree has been benefited by having the soil about it cultivated to some extent and also shaded. More than that, it stands on a windy site. It thrives under these conditions.



THE GINKGO

Note the peculiar outspreading branches. All of the ginkgos that were noticed in the park were growing well. There are, in this country, no insects or fungi which attack this tree.



CUCUMBER TREES

These two large trees in the Ramble show the good development of this species under conditions favorable to it. Compare their appearance with others not so well situated.

A POLICY OF FORESTRY FOR THE NATION

BY HENRY S. GRAVES

UNITED STATES FORESTER

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE AND A FURTHER OUTLINE IS PUBLISHED HEREWITH. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—EDITOR.

A NATIONAL policy of forestry seeks the protection and beneficial utilization of our present forest resources, the renewal after cutting of forests on lands not needed for agriculture and settlement, the stability of forest industries and of satisfactory conditions for forest workers, and the restoration of forest growth on lands now unproductive and idle.

The public interests in the continuance of forests justify and require direct ownership of extensive areas, and also participation by the public in working out the problem of protection and renewal of private forests. A program of forestry for the nation should include action by the public through the Government and the States, action by land owners and operators, and the means of uniting the efforts of all for the achievement of a common purpose.

The service of forests is not alone local; it is national as well. For the products are widely distributed without reference to State lines, the industries are engaged in interstate business, and the protective benefits of forests often extend far beyond the localities where they are situated. It is the function of the Federal Government to take the leadership in formulating a national economic policy that gives consideration to the relationship of all forests to the industrial life of the country. The central Government alone can bring about concurrent and harmonious action within given regions. Its research and educational work may be directed to the problems of the nation and of regions that comprise more than one State. Representing the whole Nation, the Government can stimulate and guide local action where individual States by their own efforts would fail. The Government can act to organize all agencies affected by the forest problem in a united undertaking to inaugurate and carry out a program of forestry.

The States have not only the function of handling the public forests owned by them, but they have also a direct responsibility in the protection and continuance of private forests. In this, the Federal Government should take part to meet interstate and national prob-

lems, to stimulate action by the States, and to bring into harmony the efforts of the different States. In the problem of private forestry, the Government would work through and in cooperation with the States. The legislation affecting the private owner in the matter of protection and continuance of forests should be by the States. The Government should help the States in formulating plans and developing methods and by direct assistance in carrying them out. The assistance offered by the Government should be contingent upon the States taking legislative and administrative action to provide for the protection and renewal of their forests.

A national policy must recognize the problems of the private owner of forests. Greater security of forest property from fire, better returns from timberland in the long run, and more stable industrial conditions must be sought. A program in which the public participates and recognizes industrial problems, like taxation, would enable private proprietors to handle their forests in a way not to be a public injury but to serve in building up the localities in which they are situated.

PUBLIC FORESTS.

There should be an extensive program of public forests, owned by the Nation, by the States, by municipalities, and, too, by quasi-public institutions and organizations. The public forests today comprise about 25 per cent of the total forest area of the country. They should be extended to include ultimately from 40 to 50 per cent.

In any plan of extensive public holdings, whether Federal or State, provision should be made for returning to the communities a share of the receipts, as is done in case of the National Forests, or otherwise to compensate them for withdrawing the lands from taxation.

The Federal Government should not only provide adequate support properly to protect and develop its forest properties; it should also rehabilitate, by planting if necessary, the depleted and wasted cut-over and burned lands.

DURING THE LAST SIX MONTHS THERE HAS BEEN A GREAT DEAL OF DISCUSSION REGARDING THE NEED OF A NATIONAL POLICY OF FORESTRY AND WHAT SUCH A POLICY SHOULD COMPRISE. DURING THAT PERIOD I HAVE HELD MANY CONFERENCES WITH FORESTERS, LUMBERMEN AND OTHERS INTERESTED IN THE QUESTION IN DIFFERENT PARTS OF THE COUNTRY, AND HAVE PRESENTED CERTAIN PRINCIPLES WHICH I BELIEVE SHOULD UNDERLIE SUCH A POLICY.

I HAVE RECEIVED MANY INQUIRIES REGARDING VARIOUS POINTS IN THE POLICY AS I HAVE SET IT FORTH. I HAVE THEREFORE PREPARED A STATEMENT MORE COMPREHENSIVE THAN HERETOFORE IN ORDER TO CLARIFY THE OBJECTIVES AND WHAT STEPS SHOULD BE TAKEN TO ATTAIN THEM. THIS STATEMENT MAY BE OF INTEREST IN CONNECTION WITH THE DISCUSSION OF A NATIONAL POLICY OF FORESTRY.

HENRY S. GRAVES.

NATIONAL FORESTS.

The Federal holdings should be extended by purchase, by exchange of stumpage for land, and by placing under permanent administration forest lands now in the unreserved public domain.

The program of acquisition should seek two classes of forest land:

1. Areas needed for the protection of water resources, to prevent erosion, for recreation and other general public purposes. These should include both virgin forests and cut-over lands.

2. Cut-over lands, with the purpose of insuring the production of lumber and other products and of establishing demonstration areas and centers for Federal cooperation with States and private owners.

The present Weeks Law program contemplates the purchase of about one million acres in New England and five million acres in the Southern Appalachians. This program should be completed as fast as is compatible with public financial conditions, and should be extended to include other important areas needed for watershed protection and other general public service. Lands acquired for protective purposes as well as those for lumber production should be distributed through all forest regions of the country.

The acquisition of cut-over lands by exchange for stumpage would serve to consolidate and block out the National Forests of the West. This principle has already been recognized in several special laws applicable to certain Forests.

There are still forest lands in the public domain which should be added to the National Forests. There are several million acres of such lands outside of Alaska. The great forests of the interior of Alaska should also be placed under adequate protection and administration.

STATE FORESTS.

The States should establish public forests, with the same general objectives as the Federal Government, and with special reference to the economic and industrial needs within their boundaries. Many western and southern States still own forest lands received from previous grants from the Government; these should be placed under permanent forest administration, with provision for the settlement of areas suited to agriculture. Lands reverting to the States for taxes or otherwise should, where practicable, be retained and used to build up permanent public forest reservations.

OTHER PUBLIC FORESTS.

Every encouragement should be offered to municipalities to establish public forests or woodland parks. These may be necessary to protect the local water supplies, or to serve as public recreation grounds; and in many instances they may yield products that will help in a material way to reduce local taxation for schools or public works. Permanent institutions and organizations of a quasi-public character should also be encouraged to acquire forests and handle them on the basis of continued production.

PRIVATE FORESTS.

The safeguarding and perpetuation of forests on private lands are possible through an organized system of protection, through the prohibition of destructive processes that produce waste lands, and through the promotion of constructive and entirely practical measures of forestry. The participation, liberal cooperation, and direction of the public in working out the problems involved are necessary for success.

FIRE PROTECTION.

The objectives of fire protection are:

1. To prevent destruction and injury to standing timber by fire.
2. To safeguard young growth already established within the older timber and on cut-over lands.
3. To promote natural reproduction so far as this can be done by fire protective measures.

Effective fire protection is achieved only through a joint undertaking between the public and private agencies in which all lands, regardless of ownership, are brought under an organized system. Such a system requires:

1. An effective service for preventing forest fires and detecting and suppressing those which may be started. Such a service already exists in a number of States.
2. Improvements needed for the prompt detection and suppression of fires. These include roads, trails, lookout stations, properly located stations for rangers, bases for airplanes when these are used, and so on.
3. Measures to reduce the inflammability of the forests. These may consist of lopping the tops, as is practiced in parts of the East; or burning the brush in piles as conducted in many pine stands on the National Forests; or burning over at the proper season cleared areas, protected by fire lines, as in heavy Douglas fir stands; or in felling dead snags, as is required in many National Forest timber sales; and in other measures. In some places fire lines may be desirable, as practiced in southern California; or carefully controlled burning at the proper season of strips and selected areas, as is practical in certain open pine forests. Uncontrolled light burning should be prohibited everywhere.

4. A vigorous campaign of education of the public regarding the danger of forest fires and the need of cooperation on the part of every user of the woods.

5. A systematic campaign of law enforcement, in which all citizens should be asked to cooperate, to punish those who by carelessness or intent start fires or permit their spread.

There should be incorporated in the forest laws of every State requirements to bring all forest owners into the protective system, and to extend it to all cut-over and unimproved lands in the State, together with the disposal, by lopping or burning, of dangerous slashings and other special measures that the local conditions may require.

There should be provided by the State the administrative machinery necessary to carry out the work effectively.

The public should share in the burden of protection. The division of cost will necessarily vary in different States, as is now the case among those States which have inaugurated such a system. The public may properly bear the cost of the State-wide patrol system, including overhead, inspection, lookouts, and similar items, and a portion of the fire suppression costs.

In general, the cost of the preventive system should be shared about equally between the public and the owner of the land. At the present time assistance by the States and the efforts of the private owners alike are inadequate. Measures like brush disposal are essentially a part of the logging operations and should be a charge against it.

The Federal Government should grant liberal aid in fire protection, far greater than at present. Its aid should be contingent on the State's inaugurating and carrying out such a system as above described. This financial help should not exceed in amount that appropriated by the State.

As in fire protection, the spread of dangerous insect infestations and diseases requires the aid and direction of the public. Both the National and State Governments should participate and appropriate liberally to check the depredations.

FOREST RENEWAL.

The renewal of forests on lands not required for agriculture and settlement is an essential feature of a national policy of forestry and an effective program should be worked out in each State, backed by appropriate legislation and efficient administration, which will achieve this object on private as well as on public property. As in the case of fire protection, forest renewal on private lands requires the participation and aid of the public.

There are two problems of forest renewal; first, the restocking of lands already cut over and now in a condition of waste; and second, that of providing for natural reproduction as the timber is cut. Where there is still seed or seed-bearing trees on cut-over lands, continued fire protection may in many cases suffice for restocking. Where there is no chance for natural reproduction, planting or sowing will be necessary. The public will have to take over a large portion of these lands and restore them to productivity. In many other cases owners may be induced to restock their waste lands as a business undertaking.

Provision for forest renewal should be made at the time of cutting. Sufficient restocking of the average private tract can be accomplished by natural reproduction without resort to planting or other intensive measures. On certain types of forest, renewal will result from fire protection alone. In many instances of unrestricted exploitation, however, fire protection alone does not suffice to secure renewal and to prevent the lands becoming waste. If protection alone does not suffice to secure forest reproduction, the owners should be

required to adopt such measures as may be necessary to accomplish this, with cooperative aid by the public in working out the problem as a practical undertaking. As in the case of fire protection, the additional measures necessary for forest renewal should be made a part of a systematic program in which the public and private owners engage in a joint undertaking with a common objective.

The first steps in this undertaking are to determine in each region:

1. The circumstances under which fire protection alone will not suffice to prevent wasting of the land under prevailing methods of lumbering.

2. The additional measures necessary to secure conditions favorable for natural renewal.

3. The classes of land upon which forest growth should be continued.

4. The cooperation that should be given by the public to make feasible in practice the measures that may be necessary for the owners to take.

5. The legislation needed to bring these measures into practice, as a part of the State's program of forestry.

As in the case of fire protection, the plan for special measures and for forest renewal should be worked out through State legislation and administration, with the assistance and backing of the Government. The Federal Government should seek to secure concurrent action by the States within given economic regional units, to bring about uniform standards of practice, to conduct experiments and research, to grant material aid in various ways, and to act as a coordinating agent to bring together the different local agencies into full cooperation. The Government should make its assistance to the States contingent upon effective action by the latter.

Measures of forestry upon private lands sought by the proposed program fall into two classes: first, those necessary to prevent the lands becoming waste after lumbering; and second, those which seek a maximum production of timber and other products. The first class of measures should be required on all lands that ought to remain in forest growth. The measures to secure maximum production are of a more intensive character. They should be encouraged in every way but would not be obligatory. They involve a larger initial investment, and they render a larger ultimate return to the owner. Under the second class fall such measures as planting where needed, leaving a larger number of seed trees, cutting in favorable seed years, leaving medium sized trees even though now saleable for a second cut or for cover, various kinds of thinnings of second growth, organization of the forest work on a basis of sustained annual yield, and so on. Experiments should be conducted by the public to establish and make generally known the best practice in each region. Advice by public officers should be freely afforded. Planting stock should be offered at cost by the public. Taxes should be adjusted to encourage owners to undertake the methods found to be most efficient, and other measures of

aid given as indicated in the last section of this statement.

Every encouragement should be afforded to bring about close utilization of timber in the forest and to prevent losses in the handling and use of the manufactured product. This will be accomplished largely through cooperation and research, in bringing information to the knowledge of operators and users of wood products. It is a problem of investigation and industrial education, in which the public should take the leadership.

PUBLIC ASSISTANCE AND COOPERATION.

In a national policy of forestry the public itself should assume certain responsibilities and it should assume certain burdens. It should cooperate with and assist private owners in carrying out their part of the undertaking. The measures of cooperation fall under the following heads:

1. *Fire Protection.*—As already indicated, the public should directly share the burden of fire protection, especially in a preventive system and in the cost of suppression.

2. *Assistance in Forestry.*—The public should assist owners in working out plans for cutting that will promote natural reproduction, in planting, and in other measures of forestry. The State should offer planting stock at cost and cooperate with the owners in establishing plantations.

3. *Taxation.*—The States should adopt a form of taxation calculated to encourage good forest practice. The present methods of taxation, with their lack of uniformity in application, often tend to promote premature and wasteful cutting and to discourage forest renewal. To promote action by the State, the Federal Government should assist the States to investigate the current methods of taxation, their effect in causing premature and wasteful cutting and in increasing the difficulties of holding cut-over lands for tree growth, and should assist in drafting model tax laws applicable to various forest conditions.

4. *Forest Loans.*—Existing legislation concerning farm loans should be extended to include loans for the purchase and improvement of forest lands, to encourage the holding of lands previously acquired, where the purpose of the owner is to hold and protect cut-over lands or those having growing timber, to reforest lands by seeding or planting, or to use other measures in promoting forest production. To obtain the benefit of such loans, which should be for a maximum period of 50 years, the land owner should enter into a specific obligation to retain the land in growing timber and protect and care for it during the life of the loan.

5. *A Survey of Forest Resources.*—Funds should be provided whereby the Federal Government in cooperation with State and private interests may make a survey of the forest resources of the country. This would

determine the quantities of timber suitable for different industrial uses, the current consumption of forest products, the probable requirements of the different regions for material, the possible production of the forests by growth to meet these requirements, and other matters which will aid in developing the national forest policy.

6. *Land Classification.*—The public should cooperate in land classification to aid owners to put their lands to the most productive use. The public should aid in bringing settlers upon lands suited to agriculture, discouraging speculative undertakings that lead to the deception of innocent investors and efforts for the colonization of lands unsuited to the purpose. Land classification would indicate the classes of lands which should be devoted to the production of timber, either permanently or pending a development which would make possible their successful settlement.

7. *Research Work.*—Adequate funds should be provided to enable the Government and other public agencies to carry on investigative work needed in carrying out a national policy of forestry. This would include investigations on a larger scale than at present in determining the best methods of forest practice, and also research in forest products.

THE NATIONAL PROGRAM.

A program for the nation must be an aggregate of local programs adapted to different conditions, and correlated and standardized through the Federal Government to meet the broader requirements of the whole country. A national program cannot be put into effect in its entirety at once. Local programs will also probably have to be worked out by steps. Some States are already able to go forward more rapidly than others, partly because of their financial strength and partly because experience has already demonstrated the methods of protection and forestry required to secure results on the ground.

The initiation of a national policy of forestry requires as one of the first steps the passage of a Federal law that recognizes its objectives and provides authority and means for the Government to extend cooperation with the States in the protection and perpetuation of the forests under their jurisdiction along the foregoing lines. At the same time, Federal appropriations for the purchase of forest lands should be greatly increased.

Much can be accomplished pending such a law. Thus, there should be at once a joining of hands in a most vigorous campaign for fire protection, that will educate the public to the dangers from fire and lead to more effective action in all forest regions. Individual States should go forward with plans for better legislation and larger support of forestry. But the passage of a basic Federal law with the aid that the Nation can offer would make possible the inauguration of a policy that would secure results impossible without such national action.

A PROGRAM FOR PRIVATE FORESTRY

BY H. H. CHAPMAN

PROFESSOR OF FORESTRY, YALE FORESTRY SCHOOL

THE agitation for securing forestry practice on private lands is due; first, to the rapid destruction of the forests on lands privately owned, a nation-wide condition; second, to the growing need for forest products; third, to the inadequacy of the method of public ownership of forest lands to solve the problem on a quantitative basis, because of the small percentage of forest lands publicly owned.

I believe absolutely that public ownership and management is the best method of growing timber, and this is generally admitted by foresters and economists. But owing solely to the expense and slowness of the process of acquiring title to lands now owned privately, foresters are seeking means to check the destruction of forest values on private lands and preserve their productiveness.

Private owners have a keen appreciation of forest values of all kinds, including stumpage value of merchantable timber, protective value of forested slopes, aesthetic value of parks, and even commercial value of half grown timber. But their general desire is to realize or cash in on these values by sale of property or timber, or by turning the forest products into cash. In the process, the forest as a productive "plant" or property is wrecked or gutted as effectually as the Huns stripped the factories at Lille—and it takes just about as much patient investment and far more time to restore such forest property to productiveness.

Lumbermen, especially sawmill men, representing as they do the *business* of converting forests into cash, conduct their business logically on this basis and as a class are not interested in what becomes of the land as *forest land* after cutting. Most of them will admit this and justify it. Many are interested in forestry, provided they themselves do not have to practice it. Most of them resent, and desire to avoid, criticism for this policy, but since it is the logical economic plan for them to pursue as far as they have been able to figure it out, they go ahead on those lines, cutting out their stumpage, and abandoning the worn out mill and plant on completion of the cut.

For this policy the lumberman need not be considered either crazy, stupid, or criminal. He is a good average, short-sighted American, differing in no way from other operators who desire to skim the cream of a project, and with far more logic behind him. It pays the farmer who *owns* his soil to maintain its fertility, but the renter often resorts to skimming. It pays any business to adopt methods for securing permanence, with reduced depreciation and labor costs and greater efficiency—but the lumberman has not been able to compute the profit in maintaining and renewing his raw material by the slow growth of the forest species, which does not keep pace with his mill capacity, based as it is on large output and low *manufacturing* costs.

Self interest and public interest do not always coincide, but they are seldom diametrically opposed. The public benefit requires the curbing of selfish activities, and this usually results in the curtailment of immediate financial profit whose acquisition would result directly in public loss perhaps of a permanent character. By this curbing of greed, a business may even be made unprofitable. This usually indicates that the public benefits of this business do not offset the injuries and damage resulting from its conduct.

If a business is necessary to public welfare, which is the only excuse for its existence, public regulation will soon cause an adjustment which makes it possible to continue as before, and usually at an equal profit.

The short-sighted policy of utter destruction of private forest property, like the placer gold mining of the west, may have to be terminated in the public interest, for several reasons. We will continue to need forest products, grown on these lands, after the present supply is exhausted, if we are to continue to enjoy our present standard of living and not retrograde like the Chinese. Waste land incapable of agricultural use is an economic plague spot in a community, which can be cured by restoring forest values. Productive land, whether forest or agricultural means taxes, roads, schools, population, markets, prosperity and character. The reverse means poverty, lack of transportation, ignorance, degeneracy, insanity, and pauperism. If the reader does not believe this it is because he has never investigated conditions where such causes have operated for two generations. Those who destroy forest values create prosperity during their operations, but insure a permanent condition of destitution to follow.

We are passing through a transition stage in this country, when the process of skimming our national resources, soil, forests, and minerals, is giving way to permanent ownership and management. What is the lumberman going to do with his skinned forest land in the future? The process of selling it off to prospective settlers as agricultural land will be more and more curtailed by the interference of the same public interests, which, slow to awaken, now bid fair to adopt the principle that land must be suitable for agriculture before being disposed of to such investors. This is another example of interference with immediate profits, because of public good! Are such land owners going to oppose the educational efforts of the government, and the attempts of states to secure land classification for fear it might prevent them from unloading worthless lands on prospective farmers? The corollary of the operation of skinning the forest is to skin the settler. Yet there is evidence that many such land owners balk at this process, and sincerely desire to find some true values and real uses for their cut-over

lands—any use except forestry, for of this they are firmly persuaded that it is impractical, impossible, and unprofitable.

My own belief is that it is going to become increasingly impractical, impossible and unprofitable for owners of forest land which is non-agricultural in character to do anything else with it except to grow timber upon it, and that the process of passing the buck by exchange of ownership does not relieve the purchaser of the problem; nor will it suffice very much longer for such land owners to seek to nullify the efforts of foresters to emphasize these conditions, by applying the damning epithet of "theorist." Those lumbermen who did service in France know that forestry is not a theory. They also know that our economic conditions are rapidly approaching those of France. Foresight on our part is needed as much as it was for the French. They applied it—will we?

Close study of many areas of timber land in the south and elsewhere has convinced me that the skinning process applied to these operations actually loses money to the operator compared with that of reserving a small per cent of the less matured trees, and that reproduction even of Longleaf pine is easily obtainable by the use of simple and easily applied measures of protection. But the average timber land owner does not wish to believe this and looks only at the difficulties. He is not in the forestry game and refuses to enter it or even consider it.

If the cure for this deadlock lies in legislation we must secure the following conditions:

First, the risks of timber production as a business must be reduced. This means better fire protection, better laws for exclusion of tree diseases and insect pests, and better enforcement.

Second, proper tax legislation. This means a workable tax law removing the annual tax from timber, and imposing instead a products tax. We have no workable laws at present.

Third, actual land classification into agricultural and forest lands. If anyone thinks this is easy he is no farmer.

Fourth, capable, trained, non-political state departments of forestry with both the knowledge of forest

technique and silviculture which will enable them to advocate intelligent measures of forest regulation, and the power to enforce such measures.

Finally, we may be in position to secure by regulation the measures needed to preserve the forest land from the destructive processes which now characterize private operations.

If we begin at the other end of this chain of development, what do we get? Restrictive measures, of course, designed to force private owners to practice forestry. These measures will be formulated by politicians, or legislators, ignorant of the technique of forest production, and will be almost certainly impractical and calculated to defeat their own ends, like much of the "diameter limit" legislation which seems to be the first thought of such statesmen. Having passed such laws, we will have politicians to enforce (?) them—and they will be evaded or repealed. We will find it impossible to enforce them on land claimed to be agricultural and there will be no authoritative classification of such lands, hence no possibility of actual enforcement. Meanwhile the same legislatures which seek to regulate the owner of land will continue to sanction increasing burdens of taxation on standing timber, and may fail to provide an adequate system of fire protection to insure the survival of the plantations or young timber which they seek to force the owner to raise.

The development of forestry by states has been by no means negligible. Progress has been made in securing good and workable fire laws. Experiments have been attempted in reform of state tax legislation as affecting forests, and a determined effort has been made to keep forestry out of the miasma of party politics. But this latter struggle resembles the labors of Sisyphus, who, as soon as he succeeded in rolling the stone to the top of the mountain, witnessed its smashing descent into the depths. The biggest problem we have in this entire forestry movement is how to secure and keep trained men in charge of state forestry organizations, for without such men, we will never get even halfway up the slope of achievement in the program of securing actual forest production on private forest lands.

LET ALL SIDES BE HEARD

BY R. D. FORBES

SUPERINTENDENT OF FORESTRY, LOUISIANA DEPARTMENT OF CONSERVATION

DO we need a national forest policy, and if so just what form should this policy take? The lumbermen and the foresters of the country seem to be getting together rapidly to solve this problem. Their getting together, however, reminds one of a couple of cats, with their tails tied together, hung over a clothes line. If you don't believe that, read some of the recent discussions in the lumber journals, notably the *Lumber World Review* of Chicago. A great many articles on national

forest policy from far abler pens than the present writer's will have appeared in the columns of AMERICAN FORESTRY, and instead of addressing himself to an attempt to shed new light on the subject, he would like to make a suggestion as to one means of remedying the lack of co-operation between the lumberman and the forester in solving this problem.

No one can read the various articles pro and con which have appeared in the press of the day without

feeling that the cause of disagreement between the foresters and the lumbermen is a lack of understanding of each other's point of view. There has been a lot of good time wasted on both sides demolishing arguments that were never raised, or statements that were never made, by the opposition. And as usual under such circumstances, the less a man knew, the more positive he has been in his statements. Lumbering and forestry have been too far apart in the past. It is not at all necessary that every forester be a lumberman or every lumberman, a forester, but it certainly is essential that the forester be acquainted with the basic economic facts upon which the lumber industry rests, and that the lumberman understand the principles of forestry, before either can discuss a national timber land policy in an adequate and constructive way.

To emphasize these truths, there follows a quotation from Professor R. C. Bryant, of the Yale Forest School, who is in the very front of the small group of foresters who have a thorough understanding of the lumber business. He says: "It is one of the weak points in the profession (the forestry profession) that as yet we have not developed forester-economists who can speak authoritatively on the many vital problems affecting forests and forestry. . . . Why are not foresters called into consultation by courts and Government agencies on questions involving tariff legislation, export policy, lumber transportation, and like issues? It is, I think, largely because we have been content in the past to devote our attention to the problems which seem more closely related to forestry and have neglected the broader economic phases of the subject, which did not seem at the moment of so great interest or of such vital importance." On the other hand, to prove the contention that the lumbermen are very inadequately acquainted with the foresters' aims and work, let me ask our lumbermen friends how many of them have ever discussed forestry with professional foresters, or read articles on forestry subjects in the *Journal of Forestry*, which is the official organ of the Society of American Foresters, and reflects current opinion in the profession. AMERICAN FORESTRY has for years, of course, endeavored to place forestry before the public, but its efforts have necessarily been confined to brief and popular presentations; exhaustive and more or less technical discussions were not suited to its purpose. Certainly the meaning of forestry has been sadly twisted by some of the lumbermen when they have discussed it in the past, and this is reasonably attributable to the lumbermen's failure to inform themselves, through reading and study, on forestry subjects.

To remedy this situation why not let us all go back to school temporarily and take an examination on the subject of forestry and the lumber industry? Let the officials of the National Manufacturers' Association appoint a committee, preferably a one-man committee, to draft half a dozen questions regarding the broad economic conditions underlying the lumber industry. Let these questions be such that an intelligible answer to all six can be

made in 3,000 words. Let the Society of American Foresters appoint a similar committee to draft six questions on the fundamentals of forestry, which can likewise be adequately answered in 3,000 words. Then let a long-suffering jury of about five men, or any number deemed advisable, be chosen by joint action of the Lumber Manufacturers' Association and the Society of American Foresters to grade the replies received to both sets of questions. Every contestant would be known to the judges only by a key number, and be required to reply to every one of the twelve questions. Allow the contestants access to all of the literature on forestry or the lumber industry that they may care to delve into (for the good of their souls or for the purpose of answering the questions) and require all the papers to be in at the end of a three-months' period. Finally let the associations named or any other good and interested citizens put up a substantial sum in the form of cash prizes, say \$500, to be divided among the three best writers. Other details could be worked out very simply, but for the benefit of all concerned the writer suggests that in judging the papers plainness of language and avoidance of technicalities be considered a virtue second only to knowledge of the facts.

I at once hear the sneer of the self-made man, who says: "Some smart aleck from a college can write a better paper than a lumberman who has been knocking out his 100,000 feet a day for the last 25 years. An examination on paper is no fair test of a man's abilities. Put the same college youth at the head of a sawmill and logging job and see how long he would last." In reply, let me say first that it would hardly be practicable to test our contestants out except in some such way as I have suggested. Secondly, let me call the objector's attention to the fact that the United States Forest Service, headed by a technical forester and directed in all of its branches by either technical foresters or men who have grown up with the forestry profession, today administers 150,000,000 acres of land, has charge of about 18 per cent of the stumpage in the United States, and employs some 2,500 men every year. It expends around \$4,000,000, and takes in about \$3,500,000 annually, and will soon be self-supporting. It is a bigger concern than any lumber company in the world, and in spite of entire lack of precedents it has, within fifteen years, built up a very efficient organization. Any man who has been Supervisor of a million acres of national forest land in the west and has handled successfully the tremendous multitude of details connected with the administration of that million acres is no mere dreamer, but an exceedingly practical business man. The forestry profession is composed 99 per cent of men who have been in the business not over 20 years, and considering their youth and the difficulties which they have encountered, no fair-minded man can deny that they have done much hard and exceedingly practical work. Let us make a test of the foresters' knowledge, as compared to the lumberman's knowledge, of the whole field of forestry and lumbering.

WHAT THEY SAY AS TO A FOREST POLICY;

TREE culture and tree conservation should be taught and practiced.—*Chicago Tribune*.

The American Forestry Association is doing good service in linking the causes of roads and forestation.—*New York Times*.

It is a subject calling for a national forest policy.—*St. Louis Globe-Democrat*.

The statistics are certainly alarming.—*New York Tribune*.

We must plant trees as we plant corn.—*Hamilton, Ohio, Republican-News*.

We still refuse to learn from the countries of the Old World.—*Florida Times-Union*.

An appalling indictment of American carelessness.—*Cleveland Press*.

This is a matter of first importance.—*Rochester Democrat and Chronicle*.

In times of peace the loss of fifty millions in property at a single time would stir the world.—*Cincinnati Times-Star*.

From every side is heard words of praise for the American Forestry Association.—*Chicago Evening Post*.

The increase of trees and shaded highways will add millions to the scenic value of the country.—*Minneapolis Journal*.

Nor have we been able to think of a more lovely memorial than a colonnade of trees.—*Cincinnati Enquirer*.

We should seek to have the two improvements go hand in hand—reforestation and road construction.—*New Orleans Times-Picayune*.

The American Forestry Association earnestly aims to promote the beautification of public highways.—*Salt Lake Tribune*.

The American Forestry Association's efforts should be pushed and in the South especially it should be given the encouragement which it merits.—*Charleston, S. C., News and Courier*.

It is to be hoped the American people will take kindly to the plan of the American Forestry Association, not only as a matter of sentiment, but as a matter of common sense.—*Lincoln, Neb., Star*.

Development of a practical highway system and reforewing of our vanished forests are two cardinal points of the *Chicago Tribune's* "Middle West Program" as outlined in a stirring editorial on the need now of waking up and going to it in a business way. Contrasted with the picture the *Tribune* paints is the view of a writer in the London (England) *Morning Post*, who,

following a trip to the battlefields, writes:

"It is the silence I can't get over. Heaven knows Chateau Thierry and the villages of the Marne were not silent places in '17 and '18. There were men and noise there then. All round about you on this lonely road are the dancing poppies and above you is the Chemin des Dames with its silent and suffering trees. The trees, indeed, seem to feel the woe of war more than any other thing in nature. Gas almost seems to break their hearts, so sad and broken is their appearance. These pale, withered birch stumps and the joyous,

Tree culture and tree conservation should be taught and practiced."

For the economic side of forestry we find the editors most keen. From the *Scientific American* we find the *Boston Post* quotes this expression of opinion: "And finally to meet the domestic and foreign demand at the same time, we are clearing out our forest resources at a rate which brings the end of our wood-using industries plainly in sight—not in the next generation, but in this one—not in the next 50 years, but well inside the next 20—and all because we have no government forest policy big

enough or broad enough to handle the situation." Commenting upon this the *Post* says: "Surely there ought to be wisdom and energy enough in the land, and especially in its Congress, to act upon these valuable suggestions. Treeless China should serve as a plentiful warning." The *Globe-Democrat* of St. Louis calls for a national forest policy, basing its editorial on figures sent out by the American Forestry Association. "Conservation of our forests still left, and the methodical planting of trees," says the *Globe-Democrat*, "are clearly demanded. It is a subject calling for a national forest policy and the steady attention of Congress. Timber is as essential as wheat for the general welfare of the country, perhaps more so as a fundamental economic matter." In the *Hamilton, Ohio, Republican-News* we find that "we must plant trees as we plant corn." The editor points out that "there are limitless tracts that will grow timber but will not grow food crops, and the scientific preservation of these forests by replacing all cut trees is a form of conservation to which our horse sense ought to

direct us to turn without further delay." The importance of forestry to the high cost of living is taken up by the *New York Tribune* which calls attention to the statement by Charles Lathrop Pack on the need of a national forest policy and uses figures in the call, "What Shall We Do About It?" on the front page of the *AMERICAN FORESTRY Magazine*. "The statistics are certainly alarming," says the *Tribune*. "Of 850,000,000 acres in our original forest area but one-fourth now remains. Nor is an adequate supply being grown. So it is up to the people as individuals. Apparently despairing of getting a national forest policy, Mr. Pack makes an appeal to his fellow-citizens." According to the *Florida Times-Union*, "we still refuse to learn from the countries of the

IMPROVING THE SCENERY



(San Francisco Chronicle.)

careless poppies are strangely contrasted legacies of war."

With this picture in mind turn again to the *Tribune* which says: "The forests of Wisconsin and Michigan were once the source of great wealth and throughout the Mississippi Valley can be profitably restored and new areas of growth established. The drainage and climate of the middle west call for trees. We know what deforestation has done for such countries as China. The states should include this subject in their public policy and carry on well considered programs suitable to their own conditions. Planting along roads should be encouraged, on hill tops and slopes, and on land less available for crops. Public forest preserves should be increased.

FOREST FIRES AND "ROADS OF REMEMBRANCE"

Old World the advisability of forest conservation." The value of a forest policy to France is pointed out in the *Evanston, Ill., News-Index*, which says: "If there had been the same ruthless destruction of trees there as there has been here, there would have been little wooded territory left for the emergency in which the future of the nation lay in the balance." The *Ohio State Journal* calls attention to the year by year stand of the Association for tree planting and adds: "War brought an unusual demand for lumber and great areas were stripped to supply pressing needs.

If we will not aid in growing trees we should not complain if growing scarcity makes us pay high prices for lumber." Forest fires come in for a great deal of attention on the part of the editors. "In times of peace, the loss of fifty millions in property at a single time would stir the world," says the *Cincinnati Times-Star*, "but we have become so accustomed to colossal figures, that today, we take but passing notice of them. Future generations, however, will take notice when lumber becomes an article more scarce and more expensive even than it is today." In the *Democrat and Chronicle* of Rochester, the editor further extends the invitation of the American Forestry Association for expressions of opinion on a national forest policy and in pointing to forest fire losses, adds: "This is a matter of the first importance. There is enough information now in the hands of the government and other forestry agencies to cut down fire losses materially." The *Cleveland Press* calls the situation "an appalling indictment of American carelessness. With the passing of our forests we will lose a great national industry that yearly employs 830,000 people and supplies \$1,500,000,000 worth of products." The *Toronto Globe* suggests that returning soldiers be put to work in fire patrols. The *Daily Northwestern* of Oshkosh, Wisconsin, calls attention to grazing sheep and their ability to diminish the fire hazard. The *Houston Post* points to fire losses and says: "It was a stern reminder that provision must be made for better fire protection. The nation will repent its folly in days to come, in exorbitant lumber prices." The *Bulletin* of Maysville, Kentucky, says: "We are destroying our forests much faster than we are planting new ones and renewing old ones. In the case of preventing forest fires, the old adage that an ounce of prevention is worth a pound of cure is particularly applicable, for the cure is a mat-

ter of decades." In the opinion of the editor of the *Akron, Ohio, Press*, "forest fires can be cut in two if human carelessness is eliminated." The *Post* of Cincinnati, says that in the passing of our forests the "lumber supply will be in the hands of the timber interests of Canada," and "it does not require many fires, such as now are raging in the northwest, to counteract all efforts at conservation."

As to roadside planting the *Chicago Evening Post* says: "From every side is heard praise for the American Forestry Association."

REAL SERVICE

Flushing Daily Times.

The announcement by A. E. Davenport, chief of the construction department of the Texas Oil Company, that the fine old elm tree on the Whitestone avenue side of the property of the company has just acquired would not be destroyed, will be appreciated by every resident of Flushing.

That the tree would have come down under ordinary circumstances cannot be doubted. The *Daily Times*, in calling attention to the matter the day the announcement was made that this company had purchased the property and was planning the construction of a big service station, at once crystallized sentiment in favor of saving it.

The value of the elm as a specimen of its kind is demonstrated by the active interest in its behalf by the American Forestry Association. Although located in Washington and busily concerned with the larger questions of conserving the forests of the country, Mr. Ridsdale did not hesitate to come to the aid of this single tree.

The value of the service frequently rendered by newspapers to the community in which they are located and of the worth of an organization like the American Forestry Association are so clearly demonstrated in this instance that further comment would be superfluous.

ciation for the good service it is doing in linking the cause of roads and forestation. The trees are intended to be memorials for our soldiers who died in France and to their comrades who have come home bearing victory. Roads thus shaded and beautiful are called "Roads of Remembrance." In the *Tribune* of Salt Lake City we find that "this day, fraught as it is with great significance to the people of Utah, seem to be a propitious time to direct attention to the work of the American Forestry Association in its efforts to foster the 'Roads of Remembrance' idea. Roads and the observance of this pioneer anniversary go well together. In 1847 roads were the crying need of those who traversed the great plains and endured untold hard-

ships to bring civilization to these valleys." Speaking of the Motor Transport Corps cross-country demonstration, the *Tribune* continues: "The American Forestry Association is actively interested in the demonstration, its immediate aim being to promote the beautification of public highways by inducing states, counties, and rural communities to line their thoroughfares with trees." The *Journal* of Minneapolis points to the scenic value of tree planting and says: "The American Forestry Association has taken up the idea of tree planting along public highways. Aside from the sentiment expressed and the loyalty that will naturally be stimulated by this action, the increase of trees and shaded highways will add millions to the scenic value of the country and much more in the material value of the trees themselves. It would, indeed, be a blessing to this land if these 'Roads of Remembrance' should cause us to plant in America a tree for every tree destroyed in the war."

"It is to be hoped," says the *Lincoln Star*, "that the American people will take kindly to this plan of the American Forestry Association, not only as a matter of sentiment but also as a matter of common sense." The editor of the *Cincinnati Enquirer* views road side tree planting in this way: "Nor have we ever been able to think of a more lovely memorial of human life nor a more highly appreciated benefaction than such a collonade of trees." In *The State* of Columbia, South Carolina, we find the editor goes into discussion with the *New York Times* as to the value of various trees for memorial highways. The *State* concludes a well-shaded road would tend to allay the speed mania for "no one wishes to dart too swiftly through an avenue of beauty." The *Times Recorder* of Americus, Georgia, points to the hearty approval that has been given the Association's plan.

The *Times-Picayune* of New Orleans points to the campaign of the American Forestry Association to restore our forests and adds: "We realize, even more than the French, the necessity of forests, and it is but natural that we should seek to have the two improvements go hand in hand—reforestation and road construction—and that the idea of planting trees along side the roads should be strongly advocated." The *Republican-News* of Hamilton, Ohio, asks "what better suggestion than that of so-called 'Roads of Remembrance' for memorials?"

"BUILT-UP WOOD"

BY O. M. BUTLER

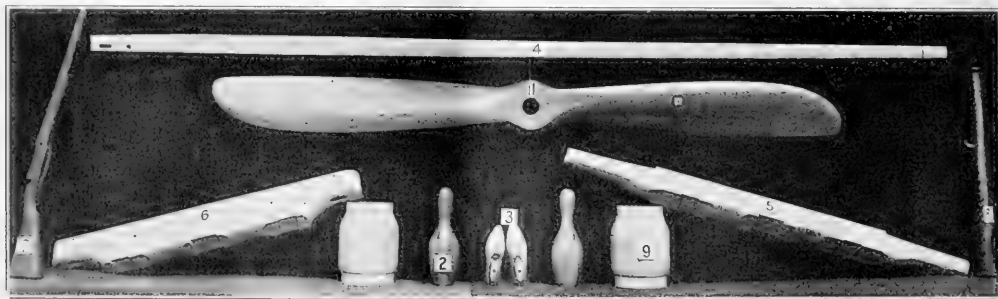
ASSISTANT DIRECTOR, FOREST PRODUCTS LABORATORY

RESEARCH in forest products, stimulated by war requirements, forecasts a far-reaching movement in the peace-time utilization of wood in new forms. One field of possibilities in particular stands out. In it lumbermen and foresters should be especially interested, because rapid advancement within the next ten or twenty years may be expected, and developments in this field may have a marked influence on the industry and the profession. This domain is the utilization of wood in built-up forms.

The trend of utilization is already strong in this direction. Built-up wood is by no means new. Before the dawn of history, the Horse of Troy, we have been led to believe, was a built-up wooden "steed of tremendous height," and on through the ages wood has been used in forms that were "built-up" in one sense or another. The

in the same way. During the war, built-up structural beams were approved by both the National and Chicago Boards of Fire Underwriters to meet the shortage of the large sizes of structural timbers, while lattice trusses of light-weight timber with the principal supporting members made of built-up stock were developed for government use to span walls as far as 100 feet apart. Recognizing that it would be a mistake for lumbermen and architects generally to adopt this form of construction without first having conclusive data as to the efficiency of specific types or standards of built-up designs, the Forest Products Laboratory now has under way, in co-operation with the National Lumber Manufacturers' Association, a series of mechanical tests on full-sized, built-up beams.

A number of factors may be mentioned as influencing this trend toward the larger use of built-up wood. New



EXPERIMENTS ARE BEING CONDUCTED UPON A WIDE VARIETY OF WOODEN ARTICLES AT THE FOREST PRODUCTS LABORATORY TO DETERMINE THE EXTENT TO WHICH THEY MAY BE MADE FROM LAMINATED STOCK. THE AIRCRAFT PROPELLER IS TYPICAL OF THE SUCCESSFUL COMMERCIAL APPLICATION OF LAMINATED CONSTRUCTION. THE OTHER ARTICLES ARE AS YET PURELY EXPERIMENTAL IN CHARACTER ALTHOUGH THE TESTS ALREADY CONDUCTED INDICATE THE POSSIBILITY OF SECURING VERY SATISFACTORY SERVICE FROM LAMINATED ARTICLES.

term, as here used, however, refers to the fabrication from smaller material of special forms or types of lumber to replace or to serve as substitutes for full-sawn or solid material. Two general methods of building up wood in this manner are now in use; one employs glue, and the other, nails, bolts, wooden pins, and other forms of fastenings, to hold the different parts or laminations together.

Glued laminations are quite widely used for the manufacture of a great variety of material for inside purposes, such as furniture, toys, mill work, etc.; but it has not found extensive application commercially for exterior or semi-exterior requirements, because the ready failure of the glue used when joints became exposed to rain or extreme changes of moisture conditions.

Laminated beams, girders, and stringers are now built up of thin pieces of lumber bolted together and used for structural purposes in the same manner as solid timbers of the same cross section. Tension members in truss design and, in fact, entire trusses have also been built up

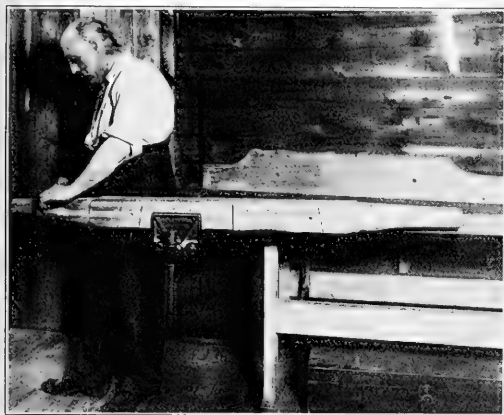
and more accurate knowledge of the mechanical and physical properties of wood and of the materials and methods essential in perfecting built-up construction is stimulating interest in its commercial possibilities. The knowledge gained through intensive research during the war relative to making glues of great strength and moisture-resistance and relative to methods of conditioning and protecting wooden laminations or parts has turned attention to the possibilities of the exterior use of built-up wood.

A second factor is the regional depletion of forests and the necessity that manufacturing plants in those regions resort to closer utilization of the remaining timber. Experience has shown that in such localities utilization becomes increasingly intensive, while the price of lumber likewise increases, thus permitting forms of utilization involving increased cost to manufacturers. Closely allied to this factor is the decreasing supply of large-sized timber from which solid beams or timbers in structural sizes can readily be obtained. War demands emphasized only

too clearly the increasing scarcity of high-grade structural timber and the necessity of providing built-up substitutes that will be practically as serviceable as the solid material.

A third factor—now more potential than immediate in its influence but which in the long run will undoubtedly exercise great pressure—is the growing economic necessity of making the national wood supply go further by utilizing material now wasted and by adopting more economical forms of construction and use.

The airplane exemplifies more than any other one thing the possibilities of built-up wood. It represents accomplishment under the propulsion of necessity and intensive application. During the early days of the war and, in fact, even after America's entrance, it has been



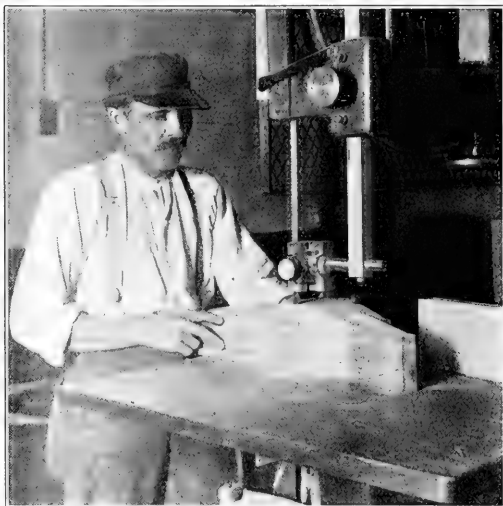
BUT LITTLE IS KNOWN AT PRESENT CONCERNING THE EFFICIENCY OF BUILT-UP AXLES AND BOLSTERS SUCH AS THOSE SHOWN IN THE ILLUSTRATION. THEY WOULD UNDOUBTEDLY BE STRONG ENOUGH TO DO THE WORK EXPECTED OF THEM, BUT NO DATA IS AS YET AVAILABLE TO SHOW HOW MUCH RESISTANCE THEY WOULD HAVE AGAINST EXPOSURE TO THE WEATHER AND THE SHOCKS INCIDENT TO USE.

said that 80 per cent of the French propellers had to be rejected before use because strains and stresses in the wood brought about by changing moisture conditions had rendered them practically useless. The propeller probably represents the most refined requirements of glued-up wood from the standpoint of manufacturing practice. It is essential that the propeller be so perfectly manufactured and finished that changing weather conditions will not pull it apart, weaken it, or even throw it out of balance or trackage to an infinitesimal degree. By the close of the war, these difficulties had been largely overcome through intensive studies of glues, protective wood finishes, and the effect of moisture upon wood.

The wing beam of an airplane illustrates another major problem in the use of glued-up wood because it must meet very precise strength requirements. Despite this fact, it was found by experiments that laminations of spruce, glued-up with strong waterproof glue, made a beam which was equal in strength requirements to a solid beam of the same dimension. The United States, England and France had actually approved such beams in their specifications. While laminated beams of many different designs were used to a limited extent by Germany and the Allies during

the early years of the war, the advantages of such beams became so apparent towards the end of the war that several of the Allies specified them to the exclusion of solid beams. While there are at present no glues available that are equal to wood in tensile strength, it is possible to join wood so that it will resist tension satisfactorily by making long scarf joints, the area of which is much greater than the cross-sectional area of the pieces to be glued. Likewise, scarf joints are used satisfactorily in beams, where both tension and compression stresses must be resisted. There is, of course, more wastage of material in the scarf.

It will be apparent that the solution of the problems involved in aircraft manufacture has general application in many other directions and the successful development of glued-up wood for exterior use under exacting aircraft requirements forecasts with seeming certainty its ultimate application to the diversified wood-using industries. There is, however, one very vital problem not encountered in airplane manufacture, and that is successful protection against bacteria, to which glued joints are now particularly subject, especially when exposed to conditions of dampness. Recent experiments, however,



IN THE MANUFACTURE OF LAMINATED BOWLING PINS THE MATERIAL OF THE PROPER SIZE AND KIND IS FIRST SURFACED ON TWO SIDES AND THEN GLUED UP INTO A BLOCK AND SET ASIDE FOR A WEEK OR LONGER TO ENABLE THEM TO REACH A STATE OF EQUILIBRIUM.

have yielded results which indicate quite conclusively that it is possible to make a glue which will be both waterproof and bacteria-proof without decreasing its strength properties.

The successful use of large built-up columns, trusses, and structural timbers of similar character is more uncertain, on account of the difficulty of designing satisfactory joints and fastenings to meet the tremendous strains to which they must be subjected. Another problem attending their use is the shrinking of the wood after they are put in place and the consequent loosening of bolts and joints. Further refinements in drying practice, however,

should go far toward solving this difficulty. In the experiments now under way to determine the possibilities of various built-up forms for heavy structural use and the efficiency of different types of joints and fastening glued laminations are not yet being used, although it is not improbable that when the effect of aging on the strength of glue becomes definitely established, glued joints may find structural application.

For smaller wooden articles, built-up wood has immediate application not only in replacing solid material but in extending the utilization of small sizes and low grades. Some of these possibilities are for wagon tongues, bolsters, wheel hubs and rims, plow beams, sled runners, automobile bodies, gun stocks, agricultural implements, athletic goods, artificial limbs, bat blocks, ladder rails, shoe lasts, porch columns and outside doors. The Laboratory has already made up as experiments sets of maple bowling pins and shoe lasts, oak wheel

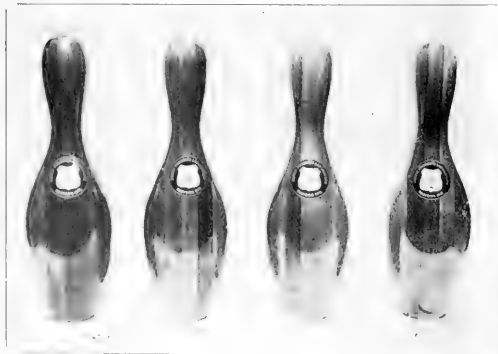
material may often be fully utilized in built-up wood. 4. In the manufacturing of certain articles now requiring select high grades, low grades obtained at cheaper prices may be substituted.

commercial practicability will undoubtedly time its widespread or general adoption. As a manufacturing process, laminated construction is in a great many cases more expensive than solid-wood construction, and there is an element of waste in the large amount of saw kerf. It would appear offhand that, so long as present differentials in the prices of thin and thick lumber and in various species prevail, built-up wood will have great difficulty generally in meeting competition. But this is not altogether the case and for the following reasons:

1. The drying or seasoning costs are lessened by laminated construction since thin lumber can be much more rapidly dried and with less loss than thick lumber.
2. The manufacturing loss in solid wood, especially where steam bending is required, as in wheel rims and certain kinds of furniture, promises to be very greatly reduced by laminated construction.
3. Scrap ends and waste material may often be fully utilized in built-up wood.
4. In the manufacturing of certain articles now requiring select high grades, low grades obtained at cheaper prices may be substituted.
5. Built-up wood makes possible better and more uniform seasoning of stock, and this in turn, makes possible a more serviceable article and tends to eliminate price competition.
6. The location of the nation's main sources of timber supply in the far West will tend to make possible the local utilization of built-up wood from other species in eastern and middle



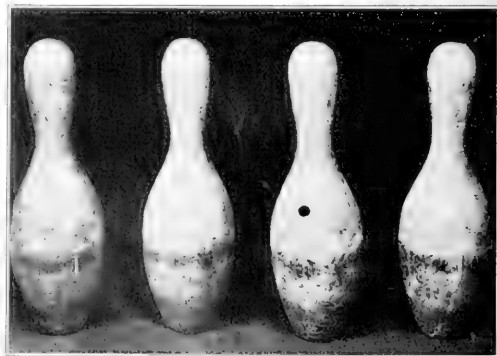
IN THE MANUFACTURE OF LAMINATED BOWLING PINS THE BLOCK HAVING BEEN ROUGHED OUT ON THE BAND SAW IS PUT IN THE TURNING LATHE AND TURNED TO THE PROPER PATTERN. AFTER A SUITABLE FINISH HAS BEEN APPLIED THE PINS ARE READY FOR TEST.



LAMINATED BOWLING PINS READY FOR TEST. THE TEST CONSISTS OF ACTUAL SERVICE IN A BOWLING ALLEY. A RECORD BEING KEPT OF THE NUMBER OF GAMES PLAYED WITH THE PINS.

rims, wagon bolsters and tongues and walnut gun stocks. These articles are now made commercially from solid wood. The experiments are in laminated construction with a waterproof casein glue in some cases and other types of glue in others. The bowling pins, under the supervision of a local alley at Madison, gave me the same service as the solid pins. The testing of the other laminated articles has not yet been completed.

While the field for laminated construction of the foregoing character is very extensive, the factor of com-



AFTER 250 GAMES THESE LAMINATED BOWLING PINS ARE STILL IN SERVICEABLE CONDITION. IN FACT THIS PARTICULAR SET IS, TO ALL INTENTS AND PURPOSES THE EQUAL OF SOLID PINS.

western regions, at prices comparable with or even below those of solid wood shipped in from distant regions.

These conditions, it will be apparent, will have a direct bearing upon the final costs of built-up wood. It is

significant that even under the price conditions existing today a suprisingly large number of laminated articles, by efficient utilization and manufacture, is being produced and marketed in competition with the solid form of construction.

Another factor with which built-up wood will have to contend for its general adoption is that of buyers' prejudice or custom. Custom has a strong hold upon the average person, particularly the rural citizen, in relation to the tools and equipment which he uses in his work. The average farmer, for example, will have to be shown that a laminated wagon tongue or bolster is serviceable and "worth the money." In the immediate development of markets for built-up wood intended to replace solid wood, price competition will, therefore, be necessary to establish the serviceability of many articles.

To the average forester and lumberman a general transition to built-up wood probably appears far distant or doubtful. The limits of its commercial practicability are, to be sure, indeterminate and problematical, but, from the standpoint of satisfactory service, there seem to be no limits to its possible substitution for most forms of solid wood. Even built-up railroad ties and telephone poles, while extreme examples, are by no means beyond the realm of possibility. Further research may be counted upon to make available glues that will be absolutely impervious to moisture and bacteria, and to determine accurately the factors of safety for all different types and forms of built-up wood. It will then become possible to use it with intelligence, economy, and safety. One cannot fail to be impressed by the possibilities of built-up wood as a factor of utilization. Not only would it make possible the saving of a large percentage of present woods and mill waste, but conceivably it would revolutionize beneficially the present milling and grading practices for many species. Select and clear material, the value of which is now lost in under-sizes or discounted by low grade classification, could be utilized and valued on the basis of the number of clear cuttings produced, the method being somewhat the same, only far more intensive; as that now used with the more valuable hardwoods and shop grades of softwoods. This general practice

would, in turn, stimulate similar refinement in stumpage valuation and would go far toward valuing the tree on its actual contents of clear material. In brief, the influence of defects upon surrounding clear material would be reduced to an almost negligible minimum, while milling practices would automatically be adjusted to an intensive manufacture either of small-dimension material for laminated manufacture in the wood-using industries or to standardized built-up, ready-to-use building lumber for the retail trade, or both. Furthermore, other species of wood now more or less unusable could be brought into use—eucalyptus, for example, because of the practicability of drying it satisfactorily in small dimensions.

A general utilization movement of the intensiveness

suggested above would naturally exercise a direct influence upon the practice of forestry. Instead of managing timber lands on long rotations, the raising of young forests under short rotations would be practicable, and foresters in working out their silvicultural plans would give special weight in the selection of species to their economic value for laminated or built-up use. Short rotations, in most instances, mean greater quantity production, higher financial returns from forest investments, and enhanced soil values, while a wider range of species utilization, which laminated construction makes possible, would tend further to increase quantity production.

Forestry has great difficulty in many regions in commending itself as a profitable or desirable financial investment because of the long rotations necessitated by present lumber and utilization standards, but built-up wood would largely remove that difficulty by making practicable comparatively short rotations for all species and the greater utilization of quick-growing and so-called inferior species now discredited with the trade and of low commercial value. It would, therefore, transform many now unattractive forest projects from unprofitable to profitable investments and stimulate the practice of private forestry in all parts of the country.

The utilization of young forests naturally raises many questions relative to seasoning, durability, mechanical properties, etc. One is apt to think that it will intensify drying difficulties on account of the increase in percent-



TWO TYPES OF LAMINATED SHOE LASTS ARE ILLUSTRATED IN THIS PHOTOGRAPH. THE UPPER LAST IS MADE WITH VERTICAL LAMINATIONS AND THE LOWER ONE WITH HORIZONTAL LAMINATIONS. THESE LASTS ARE USED IN THE MANUFACTURE OF SHOES AND RECEIVE A MUCH HARDER SERVICE THAN THE ORDINARY SHOE TREE. THE SOLID LASTS ARE USUALLY MADE OF MAPLE AND BIRCH AND THE LOSSES INCURRED IN THE SEASONING OF THE BLOCKS AND THE MANUFACTURE OF THE LASTS ARE NORMALLY RATHER GREAT. SEVERAL SHOE FACTORIES ARE COOPERATING WITH THE FOREST PRODUCTS LABORATORY IN TESTING OUT THE SERVICEABILITY OF THE LAMINATED LASTS. WHILE NO DEFINITE RESULTS HAVE AS YET BEEN OBTAINED, PRESENT INDICATIONS ARE THAT LAMINATED LASTS, BUILT UP WITH WATER-RESISTANT GLUES WILL BE QUITE SATISFACTORY.

age of sapwood, but such is not the case. On the other hand, sapwood simplifies the drying problem because of the fact that it dries more easily and better than heartwood. Likewise, the sapwood of most species, excepting that of hemlock, white spruce, and certain fir, takes preservative treatment better than heartwood, although it is not probable that this greater penetration will give greater durability than well-treated heartwood. While in the case of most hardwoods, second-growth young timber is superior in strength quality to older or mature timber, this is not true for all conifers. In fact, the reverse is more nearly the rule, but the differences are not too great or serious to be met satisfactorily by developing methods and standards of laminated construction in accordance with which the required strength for specific purposes will be obtained.

From the broad standpoint of forest conservation, built-up wood justifies thoughtful public and professional consideration. The tremendous annual loss to the nation of wood wasted under present methods of logging, milling and manufacture, is like the weather; it is much talked about but relatively little is done about it. For every foot of wood utilized we have to admit that two feet are wasted in woods, mill and factory. At the same time lumbermen admit that ten years hence the remaining large bodies of southern pine will be cut out. The country's main storehouse of timber will then be the west coast, two to three thousand miles removed from the principal consuming markets of the country. When that comes to be the case, the East and Middle West will begin to feel the full effect on the price of lumber generally of a transportation cost of from \$10 to \$20 per thousand feet. Furthermore, public measures making mandatory the more economical utilization of our forest resources may be expected in a relatively few years. It is, therefore, wise and forchanded to determine in the meantime the directions along which a sane and sound national utilization policy for the future may be shaped.

"NAPOLEON WILLOW" DYING

HEAVY with memories of Napoleonic glory and whispers of quiet St. Helena, the old tree which came from the aisle of willows at the Emperor's grave some forty years ago as a slender shoot to be transplanted to the Woodside estate of John Morris Phillips is dying. Today it is in the care of the city of Newark, part of the little park at Elwood Place which the Phillips estate presented to the city in 1892, and tree surgeons are busy on the tree, with cement for the gaping cavity at the base of its trunk and all the remedies known to science. But the willow, which has aged early, is world weary, and its wide, drooping branches are symbolic of a fast and steady decline.

In the days when the old Phillips estate, which holds a place in the city's history for 200 years, dominated the Woodside section with its twenty green acres. John Morris Phillips, lover of beautiful trees and shrubs, took delight in putting out new ones from his fine nursery. Besides trees, he had another enthusiasm—Napoleon



Photograph by courtesy of the Newark Evening News

THE FAMOUS "NAPOLEON WILLOW" AT ELWOOD PLACE

The photograph shows the dying branches on the wonderful old tree.

Bonaparte. Fine prints of the little Corsican, memoirs and documents galore bearing upon his career, were stored up at the Phillips' homestead in a collection that never seemed to stop growing. But one day there came an incident that combined the two loves of John Morris Phillips—a friend of his who had gone on a trip around the world had stopped off at St. Helena and there taken a shoot from the clump of willows that surrounded the great exile's original burial place.

The young tree was duly set out on the broad lawn facing Elwood Place, and from that time on it was the favorite of old Mr. Phillips. Set in among the elms and maples in what is now a city park, it is still the aristocrat of the lawn. Thirty-five years ago Mr. Phillips died, and the estate today is not of the size that it used to be. Neither have the same understanding hands that cared for the willow been there to care for it in the old way, for the Napoleonic tradition died.

City officials may worry about it—Carl Bannwart of the Shade Tree Department has ordered that it be given special care—attendants may potter around at the broad base of its trunk, and the curious may speculate, but the willow of St. Helena is dying.

TREES AND THE HIGHWAYS

BY PHILIP P. SHARPLES

ROAD ENGINEERING EXPERT OF THE BARRETT COMPANY

A MAN from New England carries through the length of his life a picture of a village street with high arching elms overhead beneath whose grateful shade he was wont to linger on his way from school in the first hot days of June. The elm is still there and ever will be the most attractive tree for highway planting.

Highways are built not for today, but for tomorrow in a long vista into the future. It behooves the engineer of today to look ahead. He can lay out a highway in the most approved fashion and put upon it a surface adapted to the traffic of the minute, but in the end the only permanent part of the way is the location and this our experience tells us is likely to be handed down through the generations to come.

What more fitting gift can we bestow upon posterity than the chance to enjoy roadways well located and lined with noble trees!

The details of tree planting require the co-operation of the engineer, the landscape architect and the forester. Rare is the man who combines the talents of all three and the majority of trees must be planted on an experience and common sense basis.

The engineer must determine the width of the road and the likelihood of change so that the trees may be placed where they will not be disturbed in the future. It is also up to him to tell if there should be planted trees of varieties that give dense shade, or, if such trees should be placed only on the north side of the road, for there are road locations that require sun and warmth to keep their surfaces in traversable condition the year through. It may be necessary in swampy forest locations to ruthlessly cut the trees away from the sides of the road to prevent too much dampness.

The landscape architect must decide the most effective placing of the trees, not alone for the present, but, with his imaginative eye, for the future. He must also

decide the kind of tree suited to the view and to the surroundings. Elms may be desired or a quicker growing tree like the maple or the linden. A swampy soil may call for the weeping willow or swamp maple. His problems are numerous, from the placing of an elm in New England to the designation of eucalyptus and palms in southern California. He may even throw up his hands and tell you that neither the giant cactus nor

the live oak will thrive and there can be no successful planting without irrigation. The Lincoln Highway has miles and miles of these problems in Nebraska, Wyoming, Utah and Nevada. Nothing but sage brush grows and yet even that, as vegetation, has a charm in the desert.

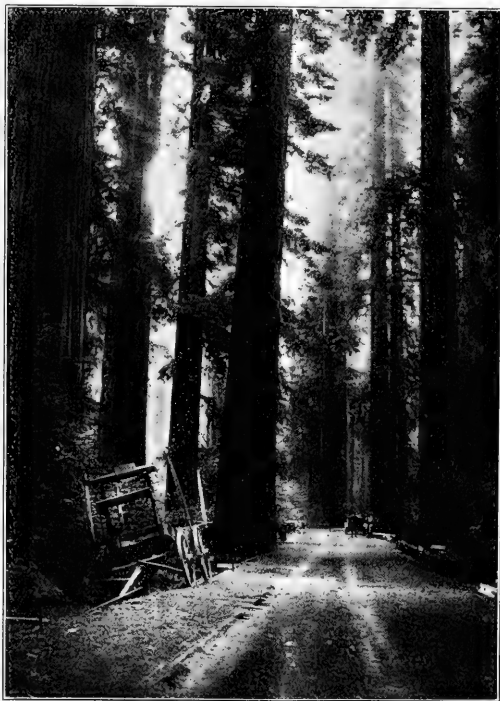
The landscape architect has other subjects than trees to consider and, perhaps, the time is not far distant when shrubs and flowers may be considered for our roadsides in our more settled communities.

The hawthorne hedges and the roadside gardening of old England are examples for the future. The possibilities in this country are not indicated in the park work of our larger cities.

The forester (and the arboriculturist is included) must indicate the kinds of trees suited to soil and locality, which ones will stand drouth and which ones water. He must indicate

the kinds that must grow in groups for self-protection and which ones can stand alone battling the winds, a sentinel and a landmark on some commanding hill. He too must devise the plans for transplanting and must attend the nurslings until they are established and care for them in the future.

In contemplating the future, let us not forget to save and cherish what we already have. The engineer should attempt to save the noble specimen on a new location, the landscape architect should attempt to utilize foliage already on the location and the forester should attempt



THE MONARCH OF FOREST TREES

Redwoods on the California State Highway, near Miranda. As Mr. Sharples says, the reconstruction of the battle areas in France is an easy task compared to replacing such trees as these.



ON THE WILLIAM PENN HIGHWAY, NEAR YELLOW SPRINGS, PENNSYLVANIA

This gives a good idea of what needs to be done to make our motor routes "Roads of Remembrance." Note the most unattractive stretch of barns and telegraph poles on the right of the road

to save for the future what our ancestors have left us.

The national forest reservations are a wonderful step in saving for the future some of the beauties nature has bestowed upon us. More must be done. The great state highway project should be made to mean more, and in building such highways advantage should be taken of natural beauties that can be preserved.

In Humboldt County, California, a new state highway is in process of construction. It is flanked with noble redwoods dating from before the time of Christ. Unless public sentiment bestirs itself, the trees along this great aisle of the cathedral of the woods are doomed to the saw and the mill. The man-made buildings destroyed in devastated France are easier to restore than one of these ancient monarchs of the forest.

Tree planting and tree saving have only been briefly touched upon. It is to be hoped that the example of France and England may not be lost on our soldiers who have been across and that we may

look forward to roads and streets better kept and more artistically treated.

THE COMMUNITY AND ROADS OF REMEMBRANCE

POSSIBILITIES of highway tree planting pointed out by Philip P. Sharples in the article are only limited to the number of miles a road may extend. The community spirit that was reborn of the war may, with the planting of "Roads of Remembrance," be kept alive and bring about a more united country. The great burden of our roads is civilization. A striking example of what may be done is seen in the plan worked out at Dryden, Michigan, by Major-General George O. Squier, chief signal officer of the United States Army. The General took a green scum covered mill pond and converted it into a beauty spot by building a miniature dam. A small club house was erected on the side of a hill. The General demonstrated right in his own home town that the beauties of a place are seldom seen by the people who live there. The result was that the little club house has become a real country club and it is the meeting place of the farmers of that county. The boys and girls of the farm community now enjoy this interesting place. Let our good roads program include such community centers and the planting of memorial trees such as General Squier is going to have planted at his home town and we will shortly have a transformed farming community.

Nearly every State in the Union is alive to these possibilities and various organizations are backing plans for memorial drives and victory highways. The Rotary Club at Bluefield, West Virginia, is one of the first branches of that organization to plan a memorial drive



A BEAUTIFUL STRETCH OF ROAD AT TOPSFIELD, MASSACHUSETTS

This shows the wonderful possibilities for Memorial Tree planting along the good roads now under construction. Compare this picture with that of the William Penn Highway in Pennsylvania.

although the Detroit Rotary Club has planted memorial trees for its members. The Rotary Club of Hamilton, Ohio, is going in for tree planting as a memorial on an even bigger scale for that organization will plant memorial trees for the soldiers of Butler County. Perhaps one of the most unique forms of hearty response to the call of the American Forestry Association for memorial tree planting is found in the *Burroughs Clearing House* magazine. This publication, which goes to the banks and bankers of the country and is devoted to office management and efficiency, gives a full page to "Roads of Remembrance" and urges the bankers of the country to visualize the possibilities for a better country and better business in the building of good roads and their beautification.

Frederick Stuart Greene, State Commissioner of Highways for New York, has outlined a plan whereby his department will plant fruit and nut bearing trees along the roads. On this point Commissioner Greene says:

"The productive fruit or nut from these trees would be ripened at just about the time we now lay off our patrolmen or repair gangs and instead of laying these men off they could be used to harvest the crops which the trees produce and with the number of trucks which the government is now turning over to the department these crops could be quickly and economically transported to markets.

"The yield from trees planted along our highways represents but a small part of their value to the State. There are few things we can do toward lengthening the life of a road more effective than the planting of trees so that the pavement is shaded. On some of our mid-summer days it is not unusual to find a temperature of from 115 to 125 degrees on the pavement itself where it is subjected to the direct rays of the sun, whereas the same pavement under the shade of a tree will show at the same time not more than 90 degrees of heat.



By American Photo Service.

PERSHING PLANTS A MEMORIAL TREE

One of the first things (after the cheering) when General John J. Pershing arrived in New York from over seas, was the planting of a memorial tree in Central Park. This pin oak from the Amawalk Nursery was planted as a memorial to the men who lost their lives in the war. The General also planted a memorial tree in Independence Square, Philadelphia.

"It is during these hot days that we most frequently get our sudden showers. The temperature of the water from one of these showers runs from about 65 to 70 degrees. On an unshaded pavement we have, therefore, a sudden drop in temperature from say 120 degrees to 65 degrees, or 55 full degrees. On a pavement protected

by the shade of trees we have a drop of from 90 to 60 degrees, or a total of 30 degrees, just one-half the change in temperature of an exposed pavement.

"The stress and amount of shrinkage set up in a pavement which is subjected to the sudden change of 55 degrees are a detriment to any type of road. Further than this, with an unexposed pavement this sudden change in temperature is more gradual, due to the fact that the leaves of the trees retard the water to some extent and the pavement does not get the full rainfall at one blow."

The soldiers, now back from France, are the strongest advocates of good roads for they know their value as perhaps no other one set of men know it.



WHAT LARGE MANUFACTURING CONCERNS CAN DO IN MEMORIAL TREE PLANTING

This picture shows the avenue leading to the works of Henry Disston & Sons, Inc., of Philadelphia. The management planted this avenue of Norway maples twenty-three years ago. Why cannot every manufacturing plant in the country plant a memorial avenue in honor of their men who offered their lives to their country?

This point of view is told in the *Amorac News*, which was published by the American Army of Occupation at Coblenz in these words:

"The most urgent necessity of our country is good roads—permanent roads that can be used twelve months in each year. The roads of America today are absolutely inadequate, inefficient, and antiquated. They are not designed to carry heavy traffic. It is a vital problem, this question of good roads, one that reaches down into the very foundation of our social and economic scheme of life, for roads are the clearing houses for the various States and the only means of free travel. Our national

municipalities have planned their own memorial highways or victory drives. In St. Albans, Vermont, for example, a memorial avenue a half-mile long has been planted by the Woman's Club. At Bridgeton, New Jersey, a drive has been planted with trees in honor of that town's heroes. These tree plantings are being reported to the American Forestry Association for registration on the National Honor Roll of trees the association is compiling. Street tree planting has been taken up anew and a fine opening for the community spirit is found in the neighbors along a street or a block getting together and deciding to beautify their surroundings. The movement

1917 -- WORLD WAR -- 1918



ACADIA SCHOOL

This bronze tablet (without the picture insert) is one of the most unique memorials marking memorial tree planting in the United States. The tablet hangs in the Acadia School, at Lavery, Pennsylvania, and each star on the tablet marks where, in the school yard, a memorial tree has been planted in honor of the former pupils. There is one star in gold, that of Lieut. Francis Tracy, who was killed in action. This tree is an oak. The others are maples. Lieut. Tracy was killed in the Argonne on his thirty-fifth birthday. The other insert, Mrs. Annie Lavery Raverott, was chairman of the dedication committee. From all over Erie county hundreds came to the dedication.

prosperity demands that this disadvantage of roads be overcome. This can only be done by honest legislators making laws, the enforcement of which shall be placed in the hands of men who have passed the test, by service in the construction and maintenance of highways."

With nearly a billion dollars appropriated from one source or another for good roads the opportunity for beautifying the roads comes right now. The movement is well underway and growing every day. Many

has spread around the world for the American Forestry Association has just received word that New Zealand has plans under way for "Roads of Remembrance" following a meeting of borough council presidents and automobile officials called by P. J. Luke, the Mayor of Wellington. One road under discussion is between Wellington and Auckland, straight across the dominion. Take up the work in your community and start the movement going as a representative of the American Forestry Association.

THE LOONS AND GREBES

(Families Gaviidae and Colymbidae)

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

“**A**S crazy as a loon” is an expression that gains force when one hears the weird notes of one of these curious divers. Beginning low, the strange sonorous sound rises in pitch and increases in volume until it ends with a terrible spasmodic gasp. Heard in

spend their summers in Canada are familiar with the loons and their ways for it is impossible to camp by the lakes where they nest without being almost continually aware of their presence. Those who do not go to Canada or visit the lake country of northern New England, however, seldom see them. They may not realize that they are present in numbers during the winter on the larger bodies of water throughout the United States

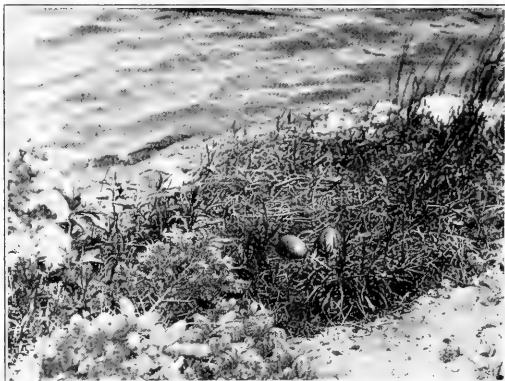


Photograph by G. A. Bailey

A CAPTIVE LOON

This beauty is in summer plumage—in winter it is gray above.

the dead of night when one is alone in the silent forest it has the faculty of arousing one from slumber with a stiffened scalp and strange prickly feeling in the vicinity of one's spine. At other times a pair of birds will hold



Photograph by G. A. Bailey

THE HOME OF AN EXCLUSIVE LOON

Though fully exposed, this nest on the shore of Georgia Bay is safe. The eggs are inconspicuous because of their olive-drab color.

and along the sea coast, for at such times they are silent and usually keep a safe distance from the shore. On their migrations over-land they usually fly high and, because of their large size and long necks, they are some-

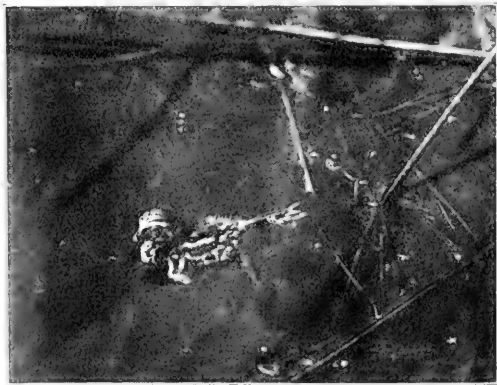


Photograph by G. A. Bailey

LOOKS LIKE A SHADOW

But it is a young loon in its characteristic coat of soft black down.

a concert or a single bird will locate a rocky cliff where there is a good echo and will call to himself for hours at a time. The notes are then different and resemble more the insane laugh of an escaped maniac. Those who



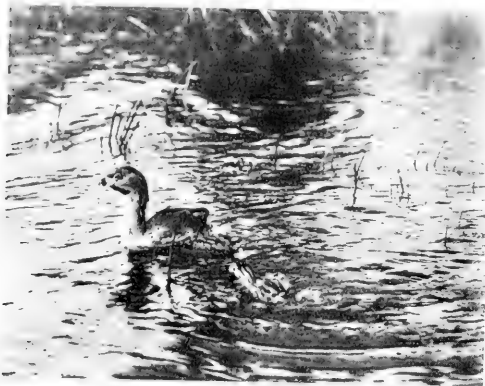
A STERN WHEELER

Young grebes resemble their parents in everything but color. Note the lobed toes and the position of the legs at the head of the body.

times mistaken for geese, but the flocks of loons never assume the characteristic wedge of the wild geese. Though occasionally there may be a hundred or more birds in the flock, they seem to care nothing for each others company but fly in scattered ranks.

During the winter all loons are colored much alike, being grayish above and white below but, during the summer, they are quite different. There are only five species of loons in the world, confined to the northern

and these are swallowed with much difficulty. The fish are pursued by the loon and speared beneath the water, the strong webbed feet of the bird driving it at such speed that the wings never have to be used unless the



"ALL ABOARD"

One young grebe is just crawling onto its father's back and the other is making haste to follow him.



Photograph by A. D. DuBois

A HORNED GREBE AT HOME

All grebes build floating nests from which they can slip readily into the water and disappear.

half of the northern hemisphere, and only one of these, the common loon, is often seen. It is black above, the back spotted with white, and there is a half ring of white streaked across the neck. The underparts are white but as it is seldom seen except on the water, the general impression is that of a black bird about the size of a goose but with a shorter neck and a longer bill. The bill is very strong and sharply pointed for it is used for

bird is wounded. The fish are never swallowed beneath water but are brought to the surface and juggled about until they can be swallowed head foremost.

The loon ordinarily lays its two olive-brown spotted eggs in a mere depression on the shore, on a hummock



BOSOM OF THE CAYUGA

A LOON ON THE Cayuga Lake in winter plumage.

spearing the fish upon which the loon lives. The fish captured by the loon are usually small but some occasionally weigh as much as a pound or even two pounds



THE "HELL-DIVER"

Otherwise known as the pied-billed grebe. Note the insignificant tail. It is a graceful bird on the water but almost helpless on the land.

of mud, or a muskrat house where it can quickly slip into the water and dive from sight. The young loons are covered with thick black down when hatched and almost immediately take to the water where they can swim and dive with the greatest ease. Campers often pursue the young birds with canoes in an effort to catch them but it is nearly impossible to do so as they can dodge very quickly and swim for long distances under water. Very often they dive deeply, turn about under the water and swim back under the pursuing canoe until they come up a long distance in the opposite direction.

The red-throated loon is the only other species found in eastern North America and it occurs within the borders of the United States, only as a winter visitant. In its winter plumage it resembles the common loon but is smaller and has the back spotted, rather than streaked with white. In summer plumage it is very different from the common loon as it has gray upper parts instead of

black, and a chestnut patch on the front of the neck.

The black-throated loon is confined to northwestern North America and northern Europe and Asia and even in winter is a rare bird within the United States. A very similar species, the Pacific loon, however, is common along the Pacific coast throughout the winter. The fifth species is called the yellow-billed loon and it, like the black-throated species, inhabits the Arctic regions of western North America and eastern Siberia. It resembles the common loon but is larger and has a yellowish bill.



WHERE THE "HELL-DIVER" LIVES

The margin of a mill pond showing the nest of a pied-billed grebe.

THE GREBES

(Family Colymbidae)

Closely related to the loons but different from them in many essentials are the grebes or, as they are popularly called, "the Hell-divers." There are twenty-five different kinds of grebes, found all over the world, and six of them are found in North America. All are smaller than the loons, being about the size of small ducks, which, indeed, they very



A CAMOUFLAGED CRADLE, THE NEST OF PIED-BILLED GREBE

Eight eggs lie concealed beneath the debris which the grebe pulled over them before leaving.



THE CAMOUFLAGE REMOVED

The conspicuous white eggs would now be quickly discovered by some hungry crow hence the necessity for concealment.

much resemble. They can always be distinguished from the ducks, however, by their pointed bills, short rounded wings, and their apparent lack of tails which are represented by mere tufts of feathers. Their feet, instead of being fully webbed as in the ducks and loons, are lobed, appearing as though the webbing had been cut between the toes. This does not seem to hinder their swimming or diving for they are fully the equals of their larger cousins, diving so deeply and remaining under for so long that they often seem never to come up. Indeed, when alarmed, they sometimes come up very quietly, letting only their bills show above the water and if there is a slight ripple on the surface they are entirely invisible. This has given rise to many stories of mysterious disappearances and to such popular names as "water witch" and "Hell-divers" already mentioned. When diving they

either dive head foremost with a flip of their feet or they settle backwards so carefully as to scarcely leave a ripple on the surface. Such expert divers are they that they prefer this method of escape to flight, especially as it seems to take considerable effort for them to rise. When they do take flight, they ordinarily patter along the surface for some distance before they are

able to get up enough momentum to lift themselves from the water. Once on the wing, however, they look a great deal like ducks because they carry their feet straight out behind them and these make up for the absence of tails which would otherwise be a conspicuous difference.

The commonest species of grebe is the pied-billed grebe, an inconspicuous brownish little bird even in its breeding plumage. It is found most often on reed bordered ponds and marshy lakes where it builds its floating nest, anchoring it to the reeds. The nest is but a pile of debris and looks like the little platforms that muskrats build to rest on. When the bird leaves the nest it carries away the eggs with some of the material of the nest, and, as she is seldom, if ever, surprised on the nest, it was once thought that pied-billed grebes did not incubate their eggs as other birds but depend upon the sun and the heat of the decaying vegetation to hatch

them. The eggs are white when first laid but soon become discolored. The young grebes, when first hatched, are curious little creatures, covered with down of a striped black and white pattern very different from that of their parents. They are able to swim almost as soon as hatched and follow their parents about the pond. When they get tired they climb upon the backs of their parents and in case of alarm, the old birds cover them with their wings and dive from sight, coming up among the reeds where they can easily hide. The pied-billed grebes are found in summer from British Columbia to Chile and Argentina, thus having one of the most extensive breeding ranges of any bird, and in winter they occur from Maryland southward.

Another common grebe is the horned grebe, so called from the tufts of yellowish feathers that decorate the

sides of the head during the breeding season. In addition to these plumes, it has the neck, breast and sides a rich chestnut and the upper parts blackish, so that altogether, it is a much handsomer and more striking bird than the pied-billed grebe. In winter plumage, however, it lacks all of these bright colors and is merely gray above and silver white be-



A WATER BABY'S FIRST SWIM

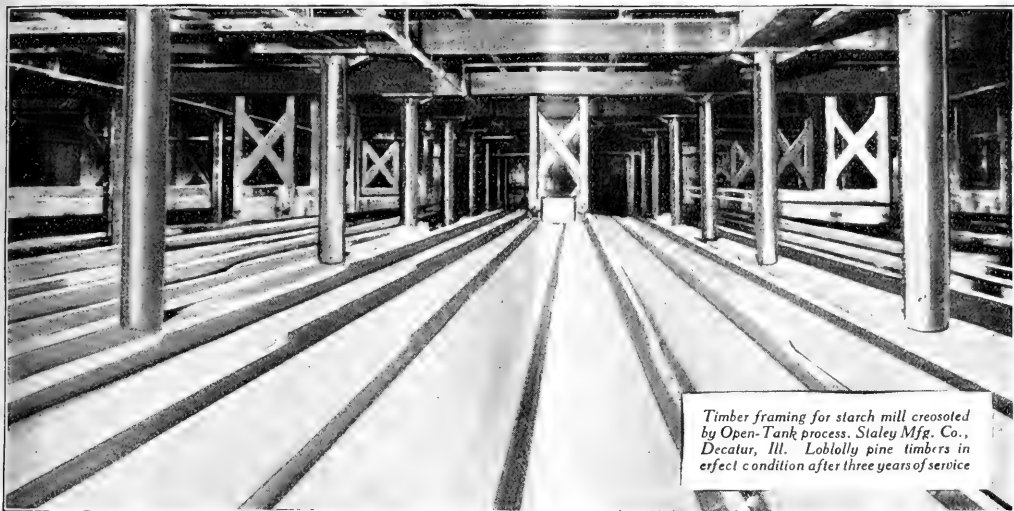
The proud mother grebe is swimming up to encourage her brave little youngster that has struggled from the nest shortly after hatching

low, the white of the under parts extending on to the sides of the head and making it a more conspicuous bird than it would otherwise be.

In its habits it is not strikingly different from its cousin, for it builds a floating nest and cares for its young in the same curious way. It is a more northern species however, nesting from northern United States northward to Alaska and wintering from the northern states to Florida.

A third and larger species is the Holboell's grebe, a less common bird than the horned grebe, although it has about the same distribution. In winter plumage it is similar to the horned grebe but does not have such white cheeks. During the summer it is conspicuously different for the throat and sides of the head are pure white and it does not have the ear tufts. A somewhat smaller species

(Continued on Page 1424)



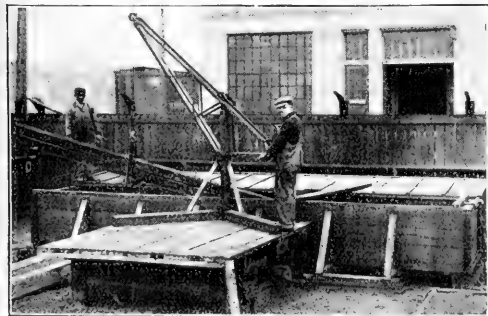
Timber framing for starch mill creosoted by Open-Tank process, Slaye Mfg. Co., Decatur, Ill. Loblolly pine timbers in perfect condition after three years of service

A Lesson in Conservation

A little over three years ago a progressive engineer saved thousands of feet of timber from the scrap heap, incidentally saving many hundreds of dollars, by using creosoted timber in a starch mill—an experiment looked upon as dangerous by other members of the profession.

The floor framing for the seven floors of the table house, consisting largely of 12" x 12" and 6" x 12" loblolly pine timbers, would not have justified the cost of laying alone because of its rapid decay under the prevailing conditions.

It was thought that creosoting the lumber *might* harm the starch. Nevertheless lumber creosoted by the Open Tank Process was employed. All details were properly attended to, and the result was a huge success.



The Open-Tank Process: Simple wooden tank (lined with sheet iron) equipped with steam-coils and small derrick. Upon expiration of the hot treatment, both oil and timber are permitted to cool instead of being transferred to a cold tank. Fence surrounding this plant has been creosoted.

After three years of use, a length of service which, untreated, this timber would not have given, all wood-work was found in excellent condition.



It was also found that the starch had not been affected the least bit by the creosoting.

Thus, Conservation and Economy were both served, and the non-pressure treatment, properly applied, again proved *worth while*.

Obviously, Carbosota Creosote Oil—the universal standard wood preservative for non-pressure treatments—was used.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases and treatment modified accordingly.)

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BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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FOREST REGULATION—Filibert Roth.....	2.00
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LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones.....	2.10
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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

THE FOREST POLICY OF FRANCE—ITS VINDICATION

(Continued from Page 1385)

advocate a wholesale transplanting of French policies or methods to the United States. Yet in many respects, what the French have done is strikingly suggestive of practical solutions of forest problems in the United States. Some of these will be discussed in greater detail in later articles. In considering them let us not forget, particularly in view of the re-awakening to the importance of our own for-

ests which the war has brought about, how the forest policy of France has vindicated itself in a crucial test of national strength.

NOTE—THIS IS THE FIRST OF A SERIES OF ARTICLES BY L. C. GORDON W. O. GREELEY ON FRENCH FORESTRY CONDITIONS. THE OTHERS ARE AS FOLLOWS: NOVEMBER, THE FOREST CODE AND THE REGIME FORESTIER. DECEMBER, THE CONTROL OF SAND DUNES AND MOUNTAIN TORRENTS. JANUARY, FORESTRY ON PRIVATE LANDS IN FRANCE.

THE LOONS AND GREBES

(Continued from Page 1422)

than the horned grebe, confined to western North America, is the eared grebe. It has the same yellowish tufts of feathers on the sides of the head but its neck is black instead of chestnut.

Another grebe of western United States is called the western grebe. It resembles the winter plumage of the horned grebe at all seasons of the year but it has a much longer and more slender neck. At one time the snowy white breast plumage of this bird was in great demand by milliners which resulted in the near extinction of this species, as well as the eared and even the horned grebes. The marshes and tule-bordered lakes of the West gave up thousands of these graceful birds to satisfy the dictates of fashion and for a time they almost disappeared. Now, however, they are protected, and, as one travels westward, he can gaze from the train windows and see them gliding over the surface of the reedy ponds and even catch glimpses of their floating nests or downy young.

TIMBER RESOURCES OF THE NORTHWEST

IF all the timber were cut into lumber and loaded on freight cars it would take 114,000,000 cars and 77,700,000 cars respectively to haul away the Douglas fir of Oregon and Washington, allowing the usual 30,000 feet of lumber to a car. Washington and Oregon contain one-third of all the standing timber in the United States. One-fourth of all standing timber in the country is Douglas fir and 80 per cent of the Douglas fir is in these two states.

The lumbering industry, including logging, sawmill operations and manufactured wood products is the largest single industry in Oregon and Washington and gives employment to nearly 60 per cent of the working population in the two states.

In Montana, a conservative government estimate places the standing timber at 63 billion feet, a large part in government forest reserves. At the present rate of cutting—300 million feet a year—it would take over 200 years to fell this enormous stand and as reforestation has already begun and methods of fighting forest fires are improving, there will be billions of feet of timber left in Montana at the end of the next hundred years.

DOUGLAS FIR AT ATLANTIC CITY

THE famous "board walk" at Atlantic City is being rebuilt of Douglas fir, replacing the planks of southern pine which have for two generations borne the weight of the gay habitudes of the popular resort of the Atlantic seaboard, according to Secretary R. B. Allen, of the West Coast Lumbermen's Association. (*The Timberman*, June, 1919, page 109.)

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

AT the first regular meeting of the Forestry Club the following officers were unanimously chosen: president, George M. Gowan; vice-president, Landis J. Arnold; secretary, Willis M. Wagoner; treasurer, Virgil Davis; sergeant-at-arms, Professor Emanuel Fritz.

Professor Mulford said a few words of greeting and welcome to old and new club members and reminded his hearers that forestry is "of age" as a science in America with the opening of this college year; the first instruction in the subject having been given twenty-one years ago.

"The very fact that the profession is of age," he said, "obligates all of us to strive for clearer thinking and more solid and adequate foundation work in research than ever before. People have a right to expect more of us and we must strive to measure up to those expectations." He predicted much better days ahead for foresters and forestry in general in spite of past and present discouragements and said he believed that the outlook for men going into forestry had never been better than at the present time.

Though only five years old and the youngest division in the College of Agriculture, the Forestry Division is now fourth in enrollment and but very little below Pomology which is next largest.

The club received from Hall and Ryerson two interesting mementos of their stay in France. One is the official badge of the French Forest Service today; the other, which is very rare, is the official badge worn by foresters during the reign of Napoleon.

Professor Bruce is at present on a field trip with Forest Examiner S. B. Show in connection with logging and mensuration studies in the Central Sierras.

UNIVERSITY OF IDAHO

DEAN F. G. MILLER, of the University School of Forestry at Moscow Idaho, has just returned from Heybourne Park where he spent several days investigating timber conditions and forest cutting there. The trip was undertaken at the request of William J. Hall, State Commissioner of Public Works. A more extended reconnaissance is planned for next summer.

Heybourne Park was purchased by the state in 1909 from the Federal Government and comprises some 8,000 acres in addition to Chatcolet Lake. It was dedicated to the people of Idaho.

Because of its accessibility, its wooded hills and lake, Dean Miller believes that it will soon become the playground of the Northwest.

Other members of the party were: W. I. Bassett, district engineer of the State Highway Department; M. H. Wolff, forest supervisor of the Coeur d'Alene National Forest; C. L. Billings, lumberman of the United States forest service; Judge E. F. Conklin, superintendent of the park, and E. C. Mohr, in charge of logging operations.

The purpose of the trip was to decide on a future policy for cutting timber.

UNIVERSITY OF MAINE

C. W. L. Chapman, a 1914 graduate of the Forestry Department of the University of Maine, has been appointed an assistant in the forestry school at Orono. Mr. Chapman has had both practical experience in the field and in teaching, is very highly recommended for his work and has also been in war work.

The school has had more applications for entrance than ever before in the history of the University, and it looks as if it will have the largest entering class. Many who dropped out during the war period are coming back to finish their work, so the prospects for the coming college year are most encouraging.

NEW YORK STATE COLLEGE OF FORESTRY

THREE developments of great importance to the New York State College of Forestry at Syracuse University have been announced on the eve of the opening of the college year of 1919-20. They are the inauguration of a department of Forest Recreation; the establishment of the Roosevelt Wild Life Experiment Station; the beginning of a series of practical forest operations in the Summer Sophomore Camp at Cranberry Lake.

The three new departures are essentially different phases of forestry training, but are at the same time allied in some of their phases.

The department of Forest Recreation was determined upon by Dean Hugh P. Baker, of the College of Forestry, some months ago. Professor Henry R. Francis was selected as the head of the department, and to prepare himself for the work, and to secure data for the opening of the course he spent the summer months in a tour of the National Parks, traveling 8,000 miles by rail, 1,200 miles by automobile and 650 by horseback and on foot. In brief the new department will train men in the problems of proper utilization of forest areas for recreation, camping, hunting, fishing, summer camps for city people, tourists, and to help make the forests attractive in all phases which appeal to the vacationist.

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A Guide Book for Parents
A Standard Annual of Reference. Describes critically and discriminately the Private Schools of all classifications. Comparative Tables give the relative cost, size, age, special features, etc. Introductory Chapters review interesting developments of the year in education—Modern Schools, War Changes in the Schools, Educational Reconstruction, What the Schools Are Doing, Recent Educational Literature, etc. Our Educational Service Bureau will be glad to advise and write you intimately about any school or class of schools.

Fifth edition, 1919, revised and enlarged. 786 pages, \$3.00. Circulars and sample pages. PORTER E. SARGENT, 14 Beacon Street, Boston, Mass.

The establishment of the Roosevelt Wild Life Experiment Station is by authorization of the state legislature, and is the direct outcome of plans made in 1916 by Theodore Roosevelt himself. The functions of the station as specified by the new law are "to establish and conduct an experimental station in which there shall be maintained records of the results of the experiments and investigations and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall at all reasonable hours be open to the public." Other duties are to make investigations of the life, histories, propagation, management of fish, birds, game and food and fur-bearing animals and forest wild life. Quarters will be provided at the College of Forestry Experiment Station at Syracuse.

The work done the past summer at the Cranberry Lake Sophomore Camp as practical training in forestry has been developed along an entirely new line, one of great interest to the students, and of a real public value as well. In some respects it is allied to the new recreational forestry department, for the students were assigned the task of laying out trails toward different parts of the camp's 1,000 acre area, for visitors to use in getting to points of interest. These trails are two in number, as the first year's work and will be maintained properly inscribed with the class numerals of the Class of '21, as mementos of the summer work of this class. The trails will next year be continued into the distant depths of the forest, and eventually it is hoped to connect them with the state system of trails and highways.

This expansion in the field of the College of Forestry has been paralleled by the largest opening attendance in the history of the institution. The freshman class entering September 16 was the largest in the history of the College of Forestry, and was larger than the entire attendance in all classes during the year of 1918-19, depleted as was the college during that year by the war conditions.

Luis J. Reyes, of Manila, a Filipino Forester, has been sent to the New York State College of Forestry at Syracuse to take a college course in forestry.

Mr. Reyes comes to America as a special student sent by the Forestry Bureau of the Philippines, after six years service as assistant wood expert in that bureau. He is a graduate of the Forest School of the University of the Philippines and after graduation was made a member of the governmental bureau.

Of special importance is the fact that he brings with him 300 authentic samples of Philippine woods, comprising 150 species, giving the College of Forestry the most

complete such collection in the country. He is to specialize in microscopic study of woods, in the course in wood technology, as the use of the high-power microscope is of utmost importance in final determination of Philippine lumber.

"The need of the microscope is shown," said Mr. Reyes, "in the case of Tangile and Red Lauan. Tangile is worth 200 pesos a thousand, and is valuable for airplane propellers as is mahogany. Lauan, however, worth only 150 pesos, resembles Tangile so closely that though entirely unfit for airplane propellers, the microscope is needed to tell the difference. That is why the scientist, and the technical forester is needed in the lumber industry in the Philippines."

FOREST SERVICE OFFERS PHOTOGRAPHIC EXHIBITS.

NEW photographic exhibits on "Forestry and Nature Study" and "Farm Woodlands" may now be borrowed from the Forest Service, United States Department of Agriculture, by schools and libraries. The "Forestry and Nature Study" exhibit is a pictorial story of how trees grow, and of the buds, leaves, flowers, and fruits, the typical forms of trees, the different kinds of forests, and the influences that affect their growth, and the enemies and friends of the forest. The "Farm Woodland" exhibit, which is especially adapted for use in agricultural and rural schools, shows different types of woodland, how the farmer can use the woodland and sell the product, and how trees make waste land profitable and help the farmer in other ways. The exhibits are made up in panel form, each panel consisting of 4 sepia enlargements.

Teachers who are interested in the forests in a more general way will find what they need in the original photograph exhibits of the Forest Service, which show forest conditions in the United States, how the forests are used, and how they may be preserved.

For classes in manual training and the like there are exhibits of commercially important woods of the United States with explanatory charts and tables. Schools that have a lantern, or can provide one, may borrow sets of lantern slides with prepared outlines for lectures on many topics connected with forestry. For instance, there are sets on forestry in the United States, and on nature study, botany, manual training, geography and agriculture in relation to forestry, and on street trees and wind-breaks. Recently a set has been made up on recreation in the national forests. Lists of subjects and other details may be secured on application to the Forest Service, Washington, District of Columbia.

BOUQUETS

"I take this opportunity to congratulate you on the very great interest you have developed in the magazine and the great increase in scope which has been evolved in recent years. It is one of the most welcome periodicals which comes to our house."

E. G. CUTLER.

"It is gratifying to see so much forestry in the August number of AMERICAN FORESTRY."

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"I was very much gratified to have the August number of your most interesting magazine, and want to congratulate you on its many entertaining and attractive features."

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"The Magazine is certainly fine."

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PROF. LEW SARETT.

DAVEY TREE SURGEONS



Estate of Mrs. A. M. Booth, Great Neck, Long Island, New York.



W. G. Woodger, Garden Superintendent, Mrs. A. M. Booth Estate

The tribute of W. G. Woodger to Davey Tree Surgery

Broad Lawns, Great Neck, Long Island, New York.
The Davey Tree Expert Co., Inc., Kent, Ohio.

Gentlemen: I felt it my duty to write you a few lines in praise of the work of your representative and men on several fine trees on the estate of Mrs. A. M. Booth, most especially the very fine work done on a grand willow tree, not quite two years ago.

My employer is most gratified with the work and thinks there is no equal to The Davey Tree Expert Company. The men are extremely keen on their work and know it thoroughly. I am very interested in their work and think them worthy of great praise.

Yours truly,

W. G. WOODGER,
Garden Superintendent.

The saving of priceless trees is a matter of first importance on every estate. Davey Tree Surgery is a fulfillment of the maximum expectations of those who love and value trees. A careful examination of your trees will be made by appointment.

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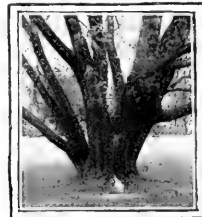
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Loss of this magnificent willow would have been irreparable. Note below how Davey methods have bound the branches together with rigid steel rods, and filled the cavities sectionally with concrete to allow for the swaying of the tree



FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements for foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester or as city forester, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years. Desiring the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is the general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local fire companies, advice about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is \$1,000 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is the advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the summer season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of references. Address Box 600, care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in forestry business; can furnish best of references. Address Box 675, care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 20th desires position in forestry work, with lumber or railroad company, or in connection with investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvements. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary \$1000 to \$120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after professional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

WANTED—Position as Forester and Land Agent. Technically trained Forester with extensive practical experience along all lines included under the duties of the above positions. For consideration, Field Artillery. Address Box 810, care American Forestry Magazine, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Hon. Jules Allard, for ten years Minister of Lands and Forests of Quebec, has resigned. Mr. Allard has been Minister longer than any of his predecessors and during his term of office more progress has been made than in the whole previous history of the Department. The revenues from Government Lands have been materially increased, one of the most efficient fire protective systems on the continent put in operation, buying of lands by timber speculators has almost wholly been eliminated, improvements have been made in cutting regulations and much important forestry legislation been enacted. Mr. Allard is a man of broad views and deep interest in the progress and welfare of his country and his Province and everyone is sorry to have him relinquish his office. He remains, however, a member of the Legislative Council and will continue to use his influence and interest for the welfare and improvement of the Crown Forests.

Mr. Allard has been succeeded by the Hon. Mr. Mercier, for some time Minister of Colonization, which Department he has successfully conducted. He brings to his new office a wide knowledge of the Province from actual experience as he has traveled all over it and has seen the forest at first hand on many a hunting and canoeing trip. He is a man of energy and broad views and will take up and worthily carry on the work started by the Hon. Mr. Turgeon and carried on by the Hon. Jules Allard so successfully.

Mr. Piche, the Chief Forester, has had several parties in the woods this summer making studies of the quantities of timber in various districts, rates of growth, conditions on cut-over areas, prevalence of various insect pests and fungous diseases and so forth. Mr. Piche has done much valuable work since he became Chief Forester and it is hoped that he will soon let his confreres have the benefit of his researches through the medium of bulletins from his Department.

Mr. Clyde Leavitt, Forester of the Commission of Conservation, underwent a serious operation early in the summer but is now back at his desk again much improved in health.

The researches of the Commission of Conservation in cooperation with the Laurentide, Abitibi and Riordan Pulp and Paper Companies have been making good progress during the summer. New sample plots and subplots have been laid out,

those on the Laurentide Company's Limits now totaling 13 acres. Here a substantial camp has been built with facilities for all sorts of research work. Studies of rates of growth, meteorological conditions, rates of evaporation, insects and fungous diseases have been carried on. It has been found, for instance, that the daily rate of growth of trees is proportional to the temperature. The borer which is causing the death of the white birch has been thoroughly studied. Areas which have been burnt are being studied under different conditions to see which trees seed in first on them and why. Different methods of cutting are being tried on a small scale.

Contracts have also been made with the Logging Departments of the Laurentide, Abitibi and Bathurst Lumber Companies to cut sample areas of about 200 acres according to forestry methods, careful records being kept of the conditions before and after cutting, the cost of logging, brush burning and utilization of smaller sizes of wood and so forth.

Although there have been many difficulties to be overcome, chiefly the late start at the beginning of the season, the seaplane patrol of the St. Maurice Forest Protective Association has been carried on with a fair measure of success and the practicability of the work demonstrated beyond any doubt. The planes have flown all over the territory of 16,000 square miles without any difficulty whatever. Fires have been discovered, explorers for one of the constituent companies have been taken over the territory they wished to see, reports of the burnt-over and timber conditions have been made, etc. The planes have proved to be too large for gasoline economy as they use 30 gallons per hour. The ideal installation would be two smaller machines for patrol purposes and a large machine to carry to the scene of a fire a portable gasoline pump and hose, tools and three men. The experiment will probably be continued next season under the auspices of the newly created Air Board. The rest of the season will be spent in photographic work for making maps.

The fire season has been the worst in Eastern Canada for several years, owing to long continued dry weather. Few fires were reported from New Brunswick, Quebec suffered a little more than in the previous year and the losses in Ontario were very large. The problem of settlers starting clearing fires in Northern Ontario will



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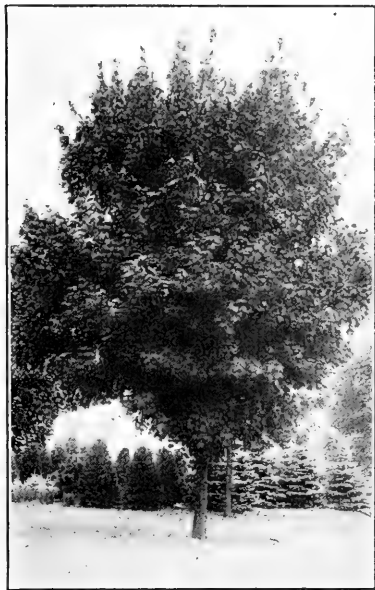
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New York



A 50-TON PULL BY HAND POWER

THIS picture, taken in Central Park, New York City, shows the "K" HAND POWER STUMP PULLER used by the City Forester in removing hundreds of dead trees up to 38 inches in diameter and 40 to 70 feet in height, as well as stumps of all sizes. Without any preliminary digging, they were pulled out by the roots in a phenomenally short time, and the saving in labor quickly paid for the machine.

The "K" is made of Bessemer steel, is light, portable, practically indestructible, and is guaranteed against breakage.

It works equally well on hillsides and marshes where horses cannot be used.

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NATIONAL FOREST TIMBER

FOR SALE

Amount and Kinds.—Approximately 61,300,000 feet B. M. more or less of white pine, larch, Douglas fir, hemlock, spruce, cedar, white fir and other sawtimber, approximately 59 per cent white pine and 70,000 cedar poles, together with an unestimated amount of piling, shingle bolts and round and split cedar posts.

Location.—Within the Kootenai and Pend Oreille National Forests, Montana and Idaho, in Sec. 19, T. 31 N., R. 34 W., M. P. M., and approximate unsurveyed Secs. 24, 25, 26, 35 and 36, T. 31 N., R. 35 W., M. P. M., Secs. 31, 33, and 34, T. 59 N., R. 3 E.; Secs. 3, 4, 5, 6, 8, 9, 10, 15, 16 and 17 T. 58 N., R. 3 E., B. M., Callahan Creek watershed.

Stumpage Prices.—Lowest rates considered, \$3.50 per M for green white pine and \$1.00 per M for dead white pine, \$1.00 per M for spruce, and 50c per M for other species; and special rates for cedar poles of various dimensions, piling, shingle bolts, cedar post material and cordwood. The removal of larch and Douglas fir saw timber, cedar posts, shingle bolts, and cordwood will be optional with the purchaser.

Deposit.—With bid, \$5,000.00 to apply on purchase price if bid is accepted or refunded if rejected.

Final Date For Bids.—Sealed bids will be received by the District Forester, Missoula, Montana, up to and including December 24, 1919. The right to reject any and all bids is reserved. Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Missoula, Montana, or the Forest Supervisor, Libby, Montana.

have to be met promptly and vigorously. The Prairie Provinces also suffered severely.

Dr. C. D. Howe has been appointed Acting Dean of the Forestry Department of the University of Toronto to take the place left vacant by the resignation of Dr. Fernow.

As Dr. Fernow was the Father of Forestry in the United States so he has been in Canada, and it is with the deepest regret that we see him giving up his active work among us. We wish him all sorts of good things in the retirement which he has chosen and shall ever remember the inspiration he has been to us and the great things he has done for forestry.

A party which has been making a survey of the areas in New Brunswick affected by the spruce bud worm, reports that practically all the balsam in that Province is affected and is dying. The spruce is only slightly attacked.

Mr. A. C. Volekmar, Forester of the Canada Paper Company, is making a reconnaissance of about two hundred square miles on the St. Ann River in Quebec.

It is reported that an aeroplane exploration undertaken by American interests in Labrador has proved a great success and that large areas of valuable timber were discovered. Confirmation of these reports and the size and amount of the timber will be awaited with interest as all previous explorers report timber only in the river valleys and that of small size.

A new saw for cutting down trees and cutting them up into logs is described in the Scientific American. It is electrically operated, the current being supplied by a portable dynamo driven by a gasoline engine. The saw is mounted on wheels and on a universal joint so that it can be set at any height or angle. Trees can be cut very rapidly and close to the ground. The set of the teeth is also novel and it is claimed that it operates very rapidly. In view of the increasing cost and decreasing efficiency of woods labor this should be thoroughly tried out and might prove of great advantage.

The Wayagamac Pulp and Paper Company have purchased a number of small caterpillar tractors and will try them in their logging operations this coming winter.

The Association of the Northeastern Foresters has decided to hold its next annual summer meeting at Grand'Mere, Quebec, as the guests of the Forestry Division of the Laurentide Company, Ltd. They will also be the guests of the Commission of Conservation at its Lac Edward Experimental Station.

ARBORISTS MEET

The American Academy of Arborists, which suspended its meetings during the period of the war has renewed its activities, and is again prepared to disseminate the much needed scientific information on the planting and growing of trees, especially at this period of reconstruction.

The Academy held its first meeting in 1915, choosing for its object the advancement of arboricultural and landscape forestry and the maintenance of the highest professional standard among its members. Its membership is now extensively distributed throughout the United States, and at its last meeting it was voted to refer important inquiries on all tree matters to the nearest regional member.

After many interesting discussions on tree problems, the following resolutions were also unanimously adopted:

"I. Resolved, That the American Academy of Arborists endorses and strongly urges the planting of trees as memorials commemorating the heroes of the World War, but strongly advises the careful selection of species native and suitable for the location. In discussing this resolution the prevailing members favored the sturdy, long-lived varieties, characteristic of American ideals, and particularly discouraged the quick growing and weak varieties.

"II. Resolved, That the American Academy of Arborists endorses the name of the Federal Horticultural Board to prevent the further importation of plant pests but urges the representation on the Board of practical arborists and foresters.

"III. Resolved, That the American Academy of Arborists endorses the work of the American Joint Committee of Horticultural Nomenclature in standardizing scientific and common plant names for use of arborists and horticulturists and obligates itself to the use of these standardized names as published by said Committee."

It was decided to hold the next meeting in Washington on the second Saturday of January, 1920, and it was also decided to have some of the papers presented before the Academy at this meeting given out for publication.

GRAYS HARBOR COUNTY WILL CUT OUT IN 16 YEARS

"APPROXIMATELY 1,000,000,000 feet of lumber was the output of the Grays Harbor County mills during the year of 1918, according to figures compiled in the office of the county assessor. The assessment rolls show that 414,295 acres of timberland remain to be logged in Grays Harbor County. The record last year was 26,364 acres cut over." (*American Lumberman*, August 16, 1919, page 70.)

This means only 16 years' cut remaining in one of the biggest timber producing districts of the Pacific Northwest.



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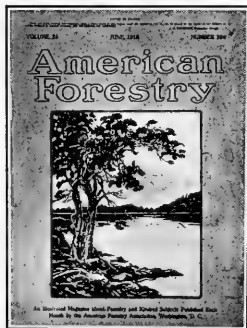
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STATE NEWS



CALIFORNIA

THIS year for the first time the state of California is enabled to benefit by the terms of the Weeks Law agreement by reason of the appropriation made by the last legislature for the prevention and suppression of forest fires," says M. B. Pratt, deputy state forester. "Through the use of the federal and state funds, approximately three million acres of brush and timber land lying in the foothills of the Sierra Nevada Mountains outside the National Forests are receiving systematic protection through the employment of four experienced patrolmen.

"These patrolmen cooperate with the federal forest service and rural fire-fighting companies organized through farm centers by the county farm agents. They are provided with Fords and fire-fighting equipment for twenty men by the state which also authorizes them to incur fire-fighting expenses to the extent of their monthly letters of authorization. These salaries are paid by the federal government through the office of the district forester at San Francisco.

"The region covered by the Weeks Law patrolmen is one of great fire hazard due to the amount of inflammable material, intense summer heat, heavy winds and the large number of campers and hunters. Precipitation in California during March, April, May and June of this year was, according to Weather Bureau records, 27 per cent, 53 per cent, 74 per cent and 97 per cent respectively, below normal. Rain cannot be expected until the last of September which makes a long fire season and strenuous work for those engaged in fire protection.

"Since being appointed in July, the Weeks Law patrolmen have been almost constantly engaged in fighting fires some of which would have swept the Sierra foothills had they not been promptly suppressed. The region which they cover is patrolled daily by airplanes from Mather Field near Sacramento, and is under the eyes of federal lookout men in the adjoining National Forests as well. As a result, fires are promptly apprehended. The very bad fire conditions have made some of them difficult to control, and several have covered five thousand acres or more destroying young timber, watershed cover and ranch property. Reports to September 1st give a total of 30,000 acres of brush and timber lands burned over outside the national forests.

"The situation is not as bad as in Idaho and Montana since the country is well settled for the most part, and there are roads and trails from which to back-fire in ad-

vance of the main fire. The loss has been serious enough, however, to make people realize that the fire problem in California is a long way from being solved. The few trained men that are on the job in the Sierra foothill country have demonstrated to the local residents what can be accomplished by organized effort, and the way is being paved for better cooperation and a more efficient organization next year."

CANADA

A. V. S. Pulling, who graduated from the New York State College of Forestry, at Syracuse, New York, in 1915, has been secured by the University of New Brunswick at Fredericton, New Brunswick, for the position in charge of the Department of Forestry. At the outbreak of the war Mr. Pulling enlisted in the 504th Engineers, winning a sergeancy, and being sent overseas with his organization.

ILLINOIS

STATE Forester R. B. Miller has had an interesting trip with Ransom H. Kennicott, Forester for the Cook County Forest Preserves, through the preserves, traveling by auto for an entire day without covering the entire chain of parks belonging to Cook County. Mr. Kennicott is confronted by the question of recreation and along this line is building roads, dams and drinking fountains and driving wells to secure drinking water for the campers and vacationists who are constantly seeking these wooded areas for health and enjoyment. On one park, the Deer Creek, he has two or three Boy Scout camps under competent direction and a Fresh Air camp, for Chicago children. The entire chain comprises 12,353 acres of forest and woodlands and on some of these he plans to maintain forest conditions and raise timber. On the Desplaines river he has also started a forest nursery of considerable size, in charge of "Bill" Johnson, of Syracuse University, who has surmounted many difficulties in the raising of seedlings. It takes a formidable force of rangers, guards, road builders, and others to look after the comfort of the public, as well as several district foresters, and Mr. Kennicott is happy in looking after all of the various projects and looking out for the comfort of his many guests.

About six miles east of Polo, Illinois, on the east side of Pine Creek, a tributary of the Rock River, in Ogle County, Illinois, is a unique white pine stand, the origin of which is unknown. Here is a fine tract of white pine resembling the finest stands in Pennsylvania or Connecticut, occupying about 150 acres. The diameter of the trees

varies from 10 to 24 inches and the height is from 75 to 80 feet. According to Wesley Bradfield, who wrote a short report on this tract some years ago, the number of trees in the two groves is 1,017 and their total volume is about 245,000 feet. According to H. DeForest, a graduate of the Yale Forest School now making a report on the flora of Ogle County, the grove is unique in that the succession is from oak to white pine rather than from white pine to oak, the ordinary succession. There is a strong local sentiment in favor of making "The Pines" a forest reserve which would be a very good way of preserving a beautiful and rare tract of native timber, one of the few in Illinois. The stream, Pine Creek, has been stocked with bass and down near the stream there is an ideal camping site. A map of the site will be found on the Dixon Quadrangle of the Illinois Geological Survey.

Governor Lowden, of Illinois, has been an enthusiast for several years in forest and ornamental planting and at his farm, "Sinnissippi," three miles from Oregon, Illinois, can be found white pine and Scotch pine plantations fifteen years of age down to recent planting, all doing remarkably well on sandy soil. Many species of hardwood trees are also growing successfully on this farm which will well repay a visit.

An informal meeting of much importance was recently held at the Quadrangle Club, in Chicago. Those present were Dr. John M. Coulter and Dr. Cowles, of Chicago University; Dr. Shepherdson, Director of Registration and Education, from Springfield, Illinois; Dr. Forbes, Chief of the State Natural History Survey Division and State Forester R. B. Miller. Among the things to be included in the work of the first year it was decided that a forest survey of at least one county was necessary, in cooperation with the soil survey and topographic survey; an investigation should be conducted showing the profit and loss from grazing in the ordinary wood lot; that demonstration forests similar to those in Ohio be established on a cooperative basis with farmers; that certain questions vital to a forest policy for the state be carefully looked up, such as state forests, state nurseries, fire protection plans and forest taxation; that the estimating of timber and the bringing together of buyer and seller was a legitimate work for the state forester to engage in and that so far as possible he should cooperate with the county advisers, through personal conferences and lectures, so as to bring forestry information to the people; in addition carry on publicity work through the press and by public lectures wherever possible. Co-

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association.

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By University Hill School: Ralph Kennicott, Miles Jain, Bert Daugherty, Ivan Pendell.

SOMERS, CONN.

By First Congregational Church: Albert Joseph Chenade, Roy Alonzo Buck, Edward Palmer Hanley, Harold Norman Bryant.

DAYTONA, FLA.

By M. Ella De Voy: Silas S. Furbush.

COUNCIL BLUFFS, IOWA.

By A. M. Hutchinson: Honor Roll of Sixty-Four Members of the S. S. 2d Presbyterian Church.

ATTLEBORO, MASS.

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By United States Army Balloon School: James Owen Curtis, Walter L. Sievers, Bertie L. Noah, Robert D. R. Weigel, Carl Frick, Anton Nepper.

VINELAND, N. J.

By City Beautiful Committee: Joast N. Denelsbeck, Adolph A. Phillips, Frederick Van Deusen, Joseph Trucano, Clarence Hartman, Grover C. Hankins, Paul G. Kimball, Daniel Ogborn, Stanley Simpkins, Joseph Di Curcio, Grady R. Roberts, Albert E. Wilkinson, Arthur E. Brooke, Charles Phillips, Joseph Lenzi, Terre Calkins, J. Alfred Ackley, Jr., Daniel B. Rhubart, Jack F. Gaskill, Aldo Bruge, Robert L. Van Deusen, Louis Gassel.

WALPOLE, N. H.

By Walpole Town Improvement Society: Henry Ellis Howland.

NEW YORK CITY.

By Mrs. Charles de Rahm, Jr.: Lieut. Charles de Rahm, Jr. By J. S. Kaplan: Lieut. Solomon Rubel.

WOODMERE, L. I., NEW YORK

By Marjorie D. Barlow: C. Loomis Dana, Jr.

SMITH'S COVE, NOVA SCOTIA.

By Mrs. Robert S. Collyer: John Chipman Thomas.

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By Geistown School: Joseph Nightingale, Othmar B. Grosch, Russell Berkey, Albert Brandle, John Brandle, Alfred Miller, Lloyd Hershberger, Charles Dill, George Nees, Thomas Nees, Victor Raab, Walter Christ, Samuel Zimmerman.

PITTSBURGH, PA.

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PLANT MEMORIAL TREES FOR OUR HEROIC DEAD

operation with the Forest Service in their national program was agreed upon as of vital importance just at this time, when a forestry policy was being formulated.

The Ayer and Lord Wood Preserving plant at Carbondale, Illinois, is one of the largest in the country and operates eight treating cylinders for treating railroad ties, zinc chloride being used at present. The plant employs as high as 285 men and treats about 15,000 ties per day. The plant for making and treating wood blocks has been temporarily shut down owing to the high price of longleaf pine. It is stated that only about 1% of the ties treated come from Illinois. Almost any species can be treated at present prices, beech being one of the new arrivals within the last few years. The Illinois Central has a treating plant at Marion, Illinois.

MASSACHUSETTS

ONE of the five state forests that have been established during the past four years in Massachusetts is situated in Southern Berkshire County, and is known as the Arthur Wharton Swann State Forest. It was a gift to the Commonwealth by Mrs. Susan R. S. Swann in memory of her husband. On this forest are many acres of chestnut growth in a dead or dying condition, and at its last session the legislature appropriated ten thousand dollars for the use of the State Forester in cutting and marketing this growth before it becomes completely valueless. It is probable that a mill will be placed on the reservation so that such sawing as may be necessary can be done without too great a haul.

After nearly a year's service in France as Y. M. C. A. secretary, Mr. Frank L. Haynes, Engineer for the State Forest Commission, has returned to this country and resumed his duties with the Massachusetts state forest department. While in France, Mr. Haynes was stationed at Aix-les-Bains, Chamonix, Paris, and St. Quay, which places were used as leave areas for the soldiers of the A. E. F.

Emulating the example of the Federal Government, Massachusetts is throwing open its state forests for the use of Massachusetts citizens for recreational purposes. The shores of the lakes and ponds within the borders of these forest reservations have been surveyed into lots of one hundred feet front on the water and two hundred feet deep. The camp sites have been divided into two classes—temporary and permanent. For the use of a temporary site a fee of one dollar per week is charged, and for the use of a permanent site the permittee pays a rental of ten dollars per year. Many of those who have selected camp sites contemplate the erection of substantial cottages. The lakes on these reservations have been stocked with bass and other varieties of fish by the Massachusetts Fish and Game Commission, so that campers are

assured of good fishing during the open season.

The auto-truck sprayers designed by the Massachusetts forestry department and used in connection with the suppression of the gypsy moth have proved to be very important factors in protecting the roadside trees from the depredations of these pests. They have taken the place of the horse-drawn sprayer, and by their use a much greater amount of territory is covered than formerly, with a reduced cost.

NEW HAMPSHIRE

TRAMPERS in the White Mountain National Forest will find ready for them next summer the first north-and-south trail extending through the area of land held by the Federal Government. The new trail will be made a reality by the construction of a link from Bartlett, New Hampshire, over Cave Mountain and Mount Parker to connect with the Davis Path on Mount Resolution. The link, which is to be constructed by the Forest Service of the United States Department of Agriculture, and the paths with which it will connect, will extend for approximately forty miles, from Wonolancet, at the extreme southerly end of the White Mountain group, to Appalachia, at the north of the Presidential Range.

Trampers can profitably spend a week in traversing the new route, according to Forest Service officials. It will pass over most of the Presidential Range, and will disclose some of the most beautiful scenery of this vacation land. Following is a description of the new route:

Old Mast road between Wonolancet and Passaconaway; Douglas Brook trail from Passaconaway to Bartlett; new link over Cave Mountain and Mount Parker to Davis path on Mount Resolution; Davis path to Crawford Bridge path, Gulfside trail, Valley Way to Appalachia.

The route is well supplied with shelter between Appalachia and Bartlett, while the hotel accommodations will be found at Passaconaway.

What to name the new route is being debated by the Forest Service men. One suggestion is that it be called Agiochochook, which is the Indian name for Mount Washington. This name is open to objection, officials say, because of its length and difficulty. There may be a compromise. In the meantime the office of the Forest Supervisor at Gorham, New Hampshire, invites suggestions.

The Forest Service also expects to have in operation early next summer the two public camping grounds that are being installed on Government-owned land. One is at the Dolly Copp farm on the State highway about five miles south of Gorham. The other is on the Profile road about seven miles from Twin Mountain, and about the same distance from the Old Man of the Mountains. The camp grounds are located in sheltered valleys and are well

supplied with piped spring water and sanitary conveniences. Each is to have a big stone fireplace for public use. Trampers, campers, and automobile parties will have free use of the grounds and conveniences, and they are invited to make use of them, subject only to the usual etiquette and protective restrictions that govern in the forests. It will be necessary, of course, for all visitors to supply their own tents.

Two acres of white pine, near Keene, New Hampshire, sold three or four years ago, before the war prices, brought \$2,000 on the stump. The total stand was 254 cords, which equals 170,000 board feet, or an average of 85,000 feet per acre. Much of it was 80 to 85 years old, so the growth was about 1,000 feet per acre per annum. Stump examinations showed a rapid growth the first 35 years.

MICHIGAN

TO date, nearly 8,000 acres have been planted with young trees on the logged over lands included within the Michigan State Forests. Some of the plantations are more than fifteen years old, but more than fifty per cent have been planted within the last five years. White pine has been planted more than any one other species, but Norway pine, Jack pine and Scotch pine are also planted largely. Austrian pine and European larch have been planted in an experimental way, but due to their inability to resist frost and drought have not succeeded well, and they are no longer used. The western species, lodgepole pine and western yellow pine were planted some years ago and gave promise of being splendidly adapted to some localities of this region, but unfortunately they were seriously injured by a fungus (*Peridermium sp.*) and all those which were planted were destroyed and no more have been set. Some few acres have been set to Norway spruce, but so far, due to their slow growth on the sand lands, they have not proven very encouraging to further planting.

Hardwoods have also been planted, poplars, oaks, walnut, black locust, etc., but none have succeeded in a satisfactory manner.

It is interesting thus to note that after fifteen years of experimentation, the conclusion is reached by the Public Domain Commissioner that it is those trees which are native to the region that are proving the most successful for reforestation. It is true that the exotic, Scotch pine, which is planted extensively in the European forests, appears to be perfectly hardy here, more so indeed than either white or Norway pine, but yet very good evidence indicates that it will not produce better lumber, if as good, as does the native Jack pine.

All the trees planted are raised in the nursery located within the Higgins Lake Forest. The nursery has capacity to produce sufficient seedlings to plant, with stock averaging two years old, 8,000 acres

per year. The loss of seedlings in the nursery from all causes, including the white grub, grass-hoppers, damping-off, heaving, frost, and drought is less than one per cent yearly.

In the plantations, however, such excellent results are not obtained. Examinations of the plantations indicate that of the white pine two and three year old seedlings planted, about sixty per cent survive. Jack pine does better, although it is planted on the poorer soils and is but one year old when set, for it is found that fully sixty-five per cent of the tiny trees survive. Scotch pine is nearly as hardy as the jack pine, but Norway pine, apparently due principally to frost killing, shows but barely fifty per cent survivals.

These mortality figures are not discouraging to the Public Domain Commission. Each year it learns more about the types of soil and the requirement of the seedlings, higher percentages of survivals are obtained. Indeed, of the two million seedlings which were planted this spring, despite the severe droughts and frosts of this summer, fully eighty-five per cent have survived, and it is expected that seventy-five per cent of these will be firmly established in 1925. Since the commission plants from 1,500 to 2,000 trees per acre, despite the losses, good stands will be obtained.

NEW JERSEY

DURING the past summer State Forester Alfred Gaskill, of the New Jersey Department of Conservation and Development, published a leaflet, which was widely announced through the press, making known the desirability and many advantages of the State forests and parks for outdoor recreation, and extending an invitation to the public to use them in this way.

This policy has met with such success, as evidenced by the numerous inquiries and applications for camp sites, that the Department's proposal to create a forty thousand acre State Forest Park along the Kittatinny Mountain in Sussex county seems assured of public approval.

New Jersey is most centrally situated with respect to population, over ten million people living within a radius of sixty miles of the capitol at Trenton.

An enormous increase in applications for camp sites must be expected as the State's invitation receives wider consideration among so many people, who seek recreation within a convenient distance from their homes.

The forest extending along the Kittatinny Mountain is a most desirable one for the expansion of State holdings, as it is well suited for recreation purposes as well as the practice of forestry. The seven thousand acres already embodied in the Stokes State Forest afford an unexcelled vacation ground for lovers of outdoor life.



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Attractive camp sites, beautiful scenery, pure mountain air and spring water, trout fishing in season, are some of the attractions offered free to the public.

Nearby are the well-known mountain lake resorts—Culvers' Lake, Lake Owassa and Swartswood Lake, where fishing, boating and bathing may be had. This region is easily accessible by motor over good roads, and by railroad so that it may be reached in a little over three hours from Jersey City or Newark.

The Department is planning to enlarge this property to include forty thousand acres and create a great State Forest Park extending for thirty-five miles along the mountain from Delaware Water Gap to the New York State line.

This area will afford exceptional opportunities for the practice and demonstration of forestry management and protection, and at the same time will doubtless prove to be one of the most popular "public playgrounds" in the east.

NEW YORK

LUMBER and forestry interests in New York State are looking forward with interest to the second week of November.

Tuesday, November 11, has been definitely set as the date for the holding of the forestry conference at which Colonel Henry S. Graves, chief forester of the United States Forest Service, will discuss at Syracuse with all interested organizations his proposed national forest policy. This is the date of the meeting of the New York Forestry Association, and many manufacturers, retailers and dealers in lumber, foresters, and others interested in conservation have accepted invitations to attend and to hear Colonel Graves explain his proposed program.

Colonel Graves had originally agreed to hold a conference with the Empire State Forest Products Association, but the forestry association got the consent of the manufacturers to the present plan so that a more general discussion might be possible.

The Empire State Forest Products Association will hold its annual convention at Albany, November 13; the American Pulp and Paper Manufacturers' Association will hold a convention in New York City the latter part of that week. Thus many of those interested will travel from Syracuse to New York City by way of Albany to participate in the three conferences.

William Shemin, a graduate of the New York State Ranger School, at Wanakena, formerly working under a College of Forestry graduate, R. E. Waldenberger, city forester of Bayonne, New Jersey, followed his chief into the service and was wounded at Vesle, when in Company G, 47th regular infantry. He has now returned to his old chief, who has taken him to Niagara where Waldenberger is superintendent of the state reservation at Niagara Falls, New York.

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The Erskine Park Everbearing Red Raspberry is a seedling from the old reliable Cuthbert, discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardiness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows, regarding this remarkable berry:

"In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Renere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. It branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large."

Of this berry we cannot say too much in praise, and we predict

that once known, it will be a standard for planting in every garden and considered a necessity.

The Renere and St. Regis have been the standard up to the present time. In the Erskine Park we have a berry that far surpasses either of these; a raspberry that is a delight to eat, each berry being of largest size, with its delicious melting flesh, full of rich creamy juice, highly flavored and sweet as honey.

Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with blossoms, green berries and ripe fruit upon it.

We have not as yet been able to propagate any large quantity of this magnificent berry, but what we have are the finest Bearing Two-Year Old Plants, heavily rooted and branched that will bring a full measure of pleasure and satisfaction to the planter.

Strong Field Grown Bearing Plants, per six, \$3; per twelve, \$5; per fifty, \$15

One dozen plants set this fall will produce more fruit than two dozen plants set next spring. Plant this fall.

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NORTH CAROLINA

THE North Carolina Forestry Association has adopted the following fourteen points in forestry and asks the support of the people of the state in securing and enforcing them:

1. The scientific classification of forest and cut-over lands as those chiefly suitable for grazing and forestry.
2. Increased ownership of non-agricultural forest lands by federal, state and municipal governments.
3. Regulation of cutting on non-agricultural land in order to maintain a productive and profitable crop, and for the protection of our streams.
4. Growing a crop of timber on agricultural land not yet needed for a more profitable crop.
5. Prevention of all unnecessary waste in cutting and marketing timber.
6. Protection from fire of all young growth as well as merchantable timber.
7. State investigations looking to the rehabilitation of our naval stores industry.
8. Practical control of serious insect pests and fungus diseases of forest and shade trees.
9. Protection of young and growing forests from livestock through proper control.
10. Effective public control of water powers as a natural resource belonging to all the people.
11. Development and management of Mitchell state park for the benefit of the people of North Carolina.
12. Maintaining and increasing the beauty of our highways by proper utilization of trees and shrubs.

13. Effective protection of birds and game both for their economic and aesthetic values.

14. Training of the young to know and appreciate the value of trees, forests and wild life.

OREGON

IN view of the recent destructive fires in the northwest forests, the Pacific Logging Congress has sent to all loggers in this vast territory a set of fire rules which are comprehensive and public-spirited. Among other rules they advise shutting down the mills during dangerous weather rather than risk a disastrous fire, not leaving a fire even after it is under control until it is thoroughly extinguished, giving fire fighting precedence over everything, using all vigor and resources, and maintaining closest cooperation with fire wardens and other government officials. Many rules cover technical matters and the subject has evidently been given very careful attention.

TEXAS

ALFRED MacDONALD of Newton, Massachusetts, has recently been appointed City Forester in Dallas, Texas. Mr. MacDonald was formerly Field Secretary of the Massachusetts Forestry Association and later spent two years in the Graduate School of Forestry in Harvard University studying problems concerning city forestry.

The city of Dallas is planning an aggressive Memorial Tree planting campaign for this fall and present indications are that several hundred such trees will be set out by the Forestry Department. The Boy



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Scouts have already been enlisted to assist in the work of the Forestry Department in locating dead trees and suppressing noxious insects.

Most of the trees heretofore planted in Dallas have been native species and Forester MacDonald is planning to try, experimentally, trees of European and Asiatic origin, such as Norway Maple, Oriental Plane and Ginkgo, which have proved so successful in Eastern cities.

VERMONT

H. E. GRUPE, who went overseas with the 10th Engineers, was detached and put on special duty in Paris in criminal investigation, work entirely distinct from military investigation. He graduated from New York State College of Forestry in 1917, and has been engaged by the State Forestry Department of Vermont, being placed in charge of a district of the state forest.

WISCONSIN

A TEN-LESSON correspondence course in the kiln drying of lumber is offered for five dollars by the Extension Division of the University of Wisconsin in co-operation with the Forest Products Laboratory. The lessons are written in simple language and explain how lumber may be kiln dried for particular purposes with results which are superior to those produced by air seasoning.

A million-pound testing machine is being built for the Forest Products Laboratory



at Madison for use in an investigation of the strength properties of large structural timbers.

Sixty-five members of the Technical Association of the Pulp and Paper Industry visited the Forest Products Laboratory on September 26 and spent the day inspecting the various departments. The visitors were particularly interested in the facilities of the laboratory for studying the control of mold in pulp wood.

SPECIAL OFFER TO MEMBERS ONLY

One of the following described books will be presented free of charge to any member of the American Forestry Association who secures ONE NEW subscribing member:

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FOREST FIRE PERIL ENDS

REPORTS and estimates from representatives of the Forest Service, United States Department of Agriculture, indicate that the period of the greatest forest fire peril that has ever confronted the Forest Service has been brought to an end by heavy rains and snows in Montana and northern Idaho. Until this sorely needed assistance from nature arrived the wooded areas of the district were so dry that fires gained terrific headway with astonishing rapidity.

A surprising number of electric storms occurred over these tinder-dry regions, unaccompanied by sufficient rain to check the flames which were started by lightning. More than half of the fires in the regions, reports show, were begun by such electrical discharges.

To meet this peril in Montana and northern Idaho, a maximum of 4,500 extra men were employed in addition to the regular forces in the field. By reason of what was probably better organization than has ever been effected heretofore, the fire fighters were able to keep the flames very largely away from the more valuable timber. While no definite figures are yet available, it is estimated that the burned area totals approximately one million acres. Much of this, however, was land which had been burned over at some previous time. What is known as a blow-up—a wind of great velocity—occurred during the season, and added greatly to the labor of the fire fighters. For a time it was feared that the destruction wrought might be as great as that in 1910.

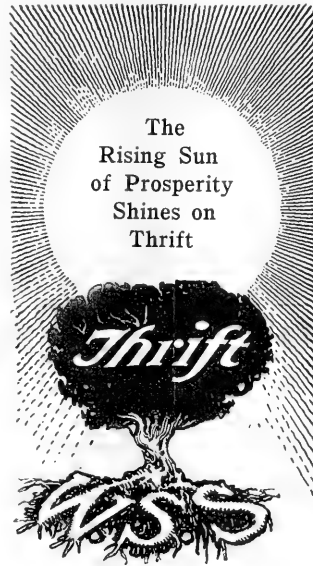
This season seven men lost their lives fighting the flames. Two died of spotted fever, one from over-exertion, and four were killed by falling trees. In 1910 more than 70 men were killed and many towns were wiped out. One crew of men this year was seriously imperiled and for many hours it was feared they had been cut off by the advancing flames. Another crew was forced to remain in a cold stream for 18 hours to avoid being burned to death, and similar measures were taken to save a pack train.

CARRIER PIGEONS REPLACE TELEPHONE

IN Oregon, as elsewhere, the telephone operators have been striking for better working conditions and as a result service has been more or less disturbed. William Sproat, of the Deschutes National Forest, however, did not worry much when he went to East Lake on special work, for instead of depending upon "central" at Bend to give him the proper connection, he took with him some carrier pigeons and in this way it was easy to send messages to his wife. The carriers made the distance from the forest to the cote in about 20 minutes and there was no "listening-in" either.

PASSING OF LUMBER INDUSTRY IN PENNSYLVANIA

N. P. WHEELER, manager of Dusenberry and Wheeler Lumber Company, of Endeavor, Pennsylvania, says his company has between 6 and 7 years more to operate and its operations are closed in Pennsylvania. There are only four large operating concerns now in Pennsylvania: Good Year Lumber Company, Norwich, which, it is reported, has one year's cut left—about 50 million feet; Salmon Creek Lumber Company (E. S. Collins), Kellett



ville, has a life of perhaps 3 or 4 years; the Central Pennsylvania Lumber Company, Williamsport, operates five mills and will finish in all probability in 6 or 7 years. The cut of these four companies will approximate 225 million feet. (*Timberman*, November, 1918, page 55.)

DOUGLAS FIR INVADERS SOUTHERN PINE TERRITORY

DIMENSION lumber is going right into Southern pine territory—a recent visitor in Portland, from Kansas City, a buyer for a wholesaler with line yards is authority for the statement that: "All of the retail yards west of the Mississippi River are handling nothing in Southern pine excepting finish and flat-grained flooring, everything in the shape of dimension is fir."—A shipment of oil rig stock or big timbers into Texas is regular but it seems strange to ship fir flooring into Dallas, but that is being done by a Washington mill whose headquarters are here, while Denver, that used to be a divided market between fir and Southern pine, is now absolutely fir. (*West Coast Lumberman*, May 15, 1919, page 25.)

NORTHERN PINE CUT IS LESS

THE steady decrease in the cut of lumber in Minnesota will be more in evidence in 1920 than is generally supposed," says R. F. Pray, manager of the Red River Lumber Company, of Westwood, California. "The J. Neils Lumber Company, of Cass Lake, with a cut of 40 million feet, and the Nicols-Chisholm plant of the Shelvlin interests at Frazee, with a similar cut, finish this year. In addition, the Weyerhaeuser plant at Little Falls, cutting 75 million feet, will saw its last board this season, and the two mills of the Northern Pine Company, at Minneapolis, with a combined cut of 100 million feet, will finish operations, to which must be added a 50 per cent reduction in the Cloquet group of mills, making a total reduction in 1920 production of approximately 450 million feet. Last year the Leach Lake Lumber Company, at Walker, Minnesota, closed. It had an annual capacity of about 20 million feet. The Deep River Lumber Company, at Deep River, Minnesota, closed in 1918, with a cut of 40 million, making a total reduction of at least 500 million feet in northern pine districts." (*The Timberman*, June, 1919.)

THE DECLINE OF A ONCE GREAT WHITE PINE CENTER

ARATHER gloomy picture of lumber conditions in the Tonawandas (Buffalo) is painted by a correspondent who says that but three lumber-handling gangs of twenty men each are working. A quarter century ago thirteen gangs of thirty men each were working almost constantly during the navigation season. Not enough lumber is coming in this summer to keep three gangs busy. He adds:

"The Tonawandas once held the record for being the largest lumber port in the world, but Chicago took that title from the local cities ten years ago and has since held it. The lumber industry here is being replaced rapidly by a variety of industries though it still holds an important place in the business world." (*Hardwood Record*, June 10, 1919.)

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LEAVES AND THEIR USES

Boston Herald

There is a great opportunity for some inventor to turn "the flying gold of the ruined woodlands" into real money by adding one more ingenuity to our new-found methods of economizing fuel. This is the season which we name from the fall of the leaves with little thought that foliage, moist on the tree or dry on the earth, has any sort of connection with daily living. Thickly as it may "strow the brooks of Vallombrosa," we treat it as an outdoor spectacle to be revelled in and nothing more and as we draw on the resources of our leaf bins, not to supersede coal, but to take comfort in a fair and cheap substitute for wood, it will be ours to wonder "why it was never thought of before."

GRASS

By John J. Ingalls

Late Senator of Kansas

"GRASS is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleagured by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of Spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world."

The South's future depends upon full utilization of its vast idle acreage, in agricultural pursuits, live stock raising and reforestation.

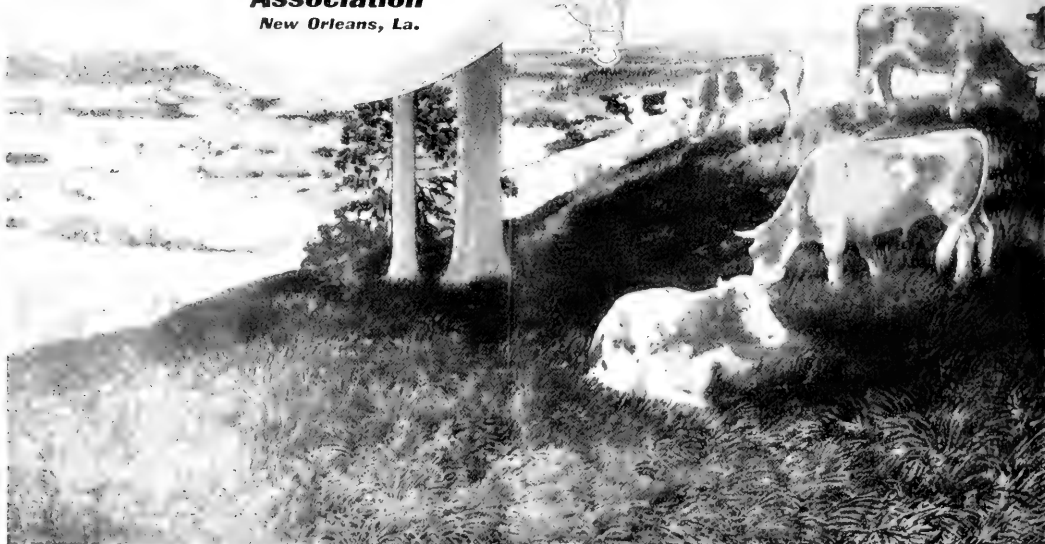
Cut Over Land Department

Southern Pine Association

New Orleans, La.

Southern Pine Association

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Complete information and list
of alumni, address

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this way

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LUCKY STRIKE
cigarette

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because like the coffee, it's better
"roasted" than raw.

It's toasted

Guaranteed by
The American Tobacco Co.
INCORPORATED

American Forestry

NEWSPAPERS ENDORSE IT

Christian Science Monitor---

What is to be done? Obviously the nation must determine upon a comprehensive and efficacious forest policy, and it must be done without delay. Every State should be behind that policy, and National and State Governments should go further than they have ever gone before to bring the matter to the attention of business and industrial communities everywhere.

Atlanta Journal---

It is to be hoped this sound advice will receive from Congress the consideration it deserves. It is gratifying to learn from reports to the American Forestry Association that the people throughout the country are beginning to realize the need of perpetuating our forests.

Philadelphia Inquirer---

It would be peculiarly appropriate if Roosevelt's name could be made the rallying cry for the preservation and perpetuation of our forests.

Boston Post---

The country should be aroused to the importance of doing everything that can be done along these lines before our woodlands are lost to us forever.

Springfield, Ohio, Sun---

The only possible remedy is the preservation of our great American forests.

The American Forestry Association

Washington, D. C.

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people, that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 530,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions, that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal State and fire protective agencies, and its encouragement and extension individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Caring of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal National and State appropriations for this work.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

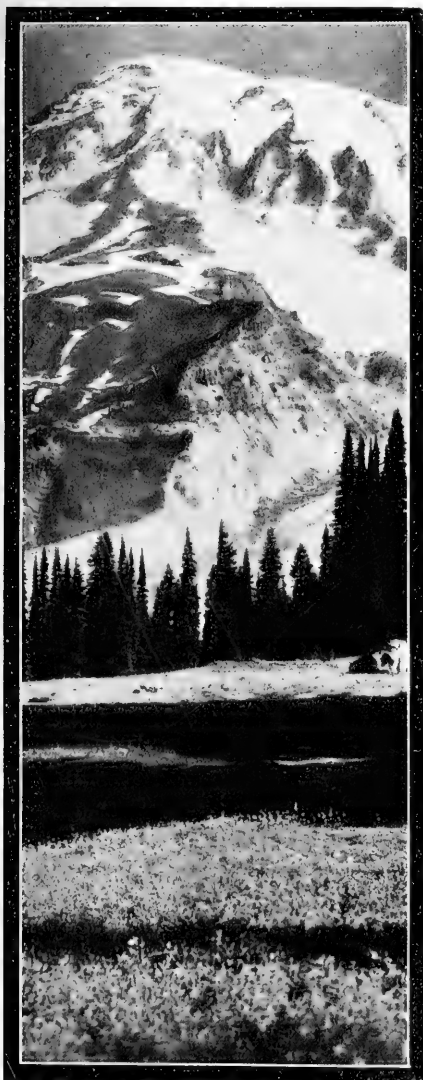
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IN BEAUTIFUL PARADISE VALLEY, MOUNT
RAINIER NATIONAL PARK

Entered as second-class matter December 24, 1909, at the Postoffice at Washington, under the act of March 3, 1879. Copyright, 1919, by the American Forestry Association. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 11, 1918.



THE GLORY OF THE REDWOODS

Redwood as for their size, staggering to the imagination in their lumber content, beautiful as marble, of trees, watch and wonder much. Surely a new race is coming in down there; men who measure their branches by almost unbelievable measure runs. "These men worship God with us!"

AMERICAN FORESTRY

VOL. XXV

NOVEMBER, 1919

NO. 311

THE GLORY OF THE REDWOODS THREATENED BY FIRE

BY M. B. PRATT, DEPUTY STATE FORESTER OF CALIFORNIA

FOREST, range and grain fires have burned over larger areas and have caused more loss in California this summer than in many years. The fire hazard was especially high as early as July due to the small amount of precipitation in the spring months, high hot winds and an unprecedented host of vacationists in the mountains, a number figured by some observers as being twice the normal. With these conditions prevalent, it is remarkable that the fires were kept down as well as they were by government, state, county and private agencies. It was not until the latter part of September, when the first fall rains were expected, that a period of intense heat accompanied by strong north winds caused the small fires to become conflagrations in a short time. In spite of every effort, fires raged uncontrolled in different parts of the state for about two weeks and it was not until a general rain fell on September 27 that they were finally controlled.

The fires in southern California were the largest since the great fire of 1910 in the San Bernardino Mountains. Fanned by heavy winds, small fires in various sections of the Angeles National Forest escaped beyond control to form a continuous line of flame over thirty miles in length and ten miles in depth. A raging, roaring sea of flame raced through Pacoima Canyon, often called the most beautiful camping spot in southern California, destroying eight summer homes and the attractiveness of the place for many years to come. The \$100,000 ranch property of Cecil B. De Mille in Tejuca Canyon was left a mass of black-

ened ruins. San Gabriel Canyon was also fire-swept and a number of cottages destroyed. At the same time fires in the San Bernardino Mountains were burning within two miles of the Los Angeles city playground, and threatening Squirrel Inn and Thousand Pines in the Rim of the World resort region.

On September 24, the Mayor of Los Angeles issued the following proclamation:

"There is raging in the Angeles National Forest Reserve, near this city, fires which threaten the entire area. We all appreciate the value of this forest. It is, from the standpoint of irrigation and flood control, priceless. It is our duty as citizens of Los Angeles to do everything in our power, to use all of the resources at our command, to co-operate with the local forest office to extinguish these fires. I feel that this fire may prove more serious to the present as well as the future generations than would a large fire in the heart of our city.

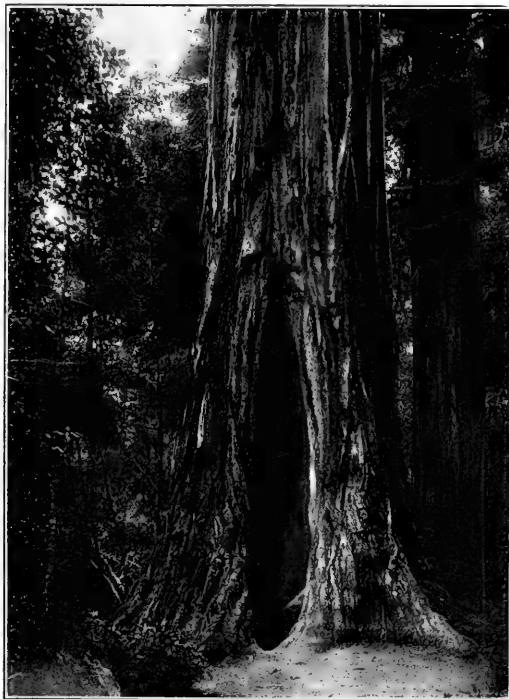
"Therefore, I request that every person who can in any way, independently or through organizations, collectively, get in touch with the local forest office and aid them in their efforts to extinguish these fires."

(Signed)

MEREDITH P. SNYDER,
Mayor.

Forest Supervisor Charlton soon had twenty-five hundred men on the fire line, and the assistance of District Forester DuBois and other district office men from San Francisco. Airplanes and free balloons from March and Ross fields took observations on the fires, and the work became so well organized that much progress was being made

in checking their spread at the time of the rain. A preliminary estimate of the area burned over places it at 237 square miles, or 151,680 acres. The Forest Service probably spent \$50,000 for labor and supplies, and lost timber and watershed cover valued at as much more. The loss of property, including that of permittees



STILL STALWART AND STRONG

Although the base of this redwood is eaten out by fire and rot until it is hollow, the tree is so sturdy that it might and undoubtedly would, stand for generations to come, if untouched by fire.

high, but the most serious consequence of these fires will be the damage which will result from the rapid runoff during the coming rainy season.

At the same time that southern California was experiencing the worst fires in its history, terrific fires were raging in the northern part of the state. On September 19, the most destructive fire that was ever experienced in Marin County, swept the slopes of Mount Tamalpais to the edge of Muir Woods before it was checked. In a few hours, more than twenty residences and summer cottages near Mill Valley were destroyed. A thousand fire-fighters which included detachments of soldiers from Fort McDowell and Fort Baker were needed to bring this fire under control.

While the Mill Valley fire was at its height, the fire in Hurricane Gulch that had previously threatened Sausalito, broke out again and swept down upon the water-front with irresistible force. The residents, exhausted from their long fight with the fire the night before, appealed to Mayor Rolph, of San Francisco, for aid. He dispatched a fire boat with thirty firemen at once, but by the time the boat had reached Sausalito the fire had burned a hall, five stores and a dozen residences. Five hundred soldiers and sailors were brought in from nearby posts and the fire was finally controlled. It is estimated that the property loss in the two Marin County towns from these fires exceeds \$200,000.

On September 20, a fire which was the result of slash burning on a lumber company's holdings in San Mateo County, swept into Santa Cruz County and entered the California Redwood Park. It was fought for a week by several hundred men, at one time coming within half a mile of Governor's Camp in the Big Basin, having claimed one hundred of the world's greatest trees. The big redwoods do not burn readily, but become weakened by brush fires about their bases and finally topple over with a great crash, carrying smaller trees with them.

"Great trees were falling all night," said Park Warden Dool. "When they fall they can be heard a mile and a half."

This is the first fire in Redwood Park in modern history. Many of the redwoods had been hollowed by previous fires—400 or 500 years ago—and so fell more readily before the flames.

"The redwoods that have fallen run to six feet in diameter and are from 250 to 275 feet high," said the Park Warden. "They were from 1,500 to 2,000 years old." An irreparable loss.

Rain came to the relief of the fire-fighters, but not until about five thousand acres had been burned over, including 1,600 acres in the proposed addition to the park. In San Mateo County, one hundred soldiers were brought from San Francisco to protect valuable private redwood and tan-bark oak holdings. The damage to the mature redwoods was not great beyond the falling of some trees through the further weakening of their fire-scarred butts. The greatest damage was through the burning of the intermingled Douglas fir and tan-bark oak, the value of which is estimated to be twenty-five dollars per acre.

The foothills of the Sierras were aflame during the latter part of September, a dozen or more fires being sighted in one day by the aerial patrolman from Mather Field on his daily round trip to Oroville. Placerville was surrounded by fires which deluged the town with falling ashes and cinders. Yuba, Nevada, and Placer County ranchers lost thousands of acres of dry feed and young timber, besides many buildings and

miles of fences. At this time, October 8, there is still a possibility of large fires unless rain falls shortly, since a heavy wind is rapidly drying out the moisture resulting from the previous rain. Fire reports show that the acreage burned over and the resulting damage has been greater than any year since 1910.

The lesson taught by these fires surely must have been learned by now. In commenting upon them an editorial



A WELL-KNOWN OLD BEAUTY—"JUMBO"

The great base of Jumbo—knotted and gnarled, the pride of the grove. These old trees made heroic resistance to the devastating fire which threatened their destruction in the early fall.

in the San Francisco *Examiner* of September 28, says in part as follows:

"We believe it would pay some prospective legislative candidate to make a serious study of the effects, in the past, of forest fires. He should get the facts of the actual money losses represented by these fires. He should become acquainted with the state's forest resources, the rates of use and the rates of renewal, and the enormous hole that is cut in these resources each year by fires.

"Mr. Homans, we feel sure, will be very glad to give him all the assistance he needs in acquiring such information.

"And then this prospective legislative candidate should make his election campaign on an issue of adequate forest protection and, when he is elected, should make a two-sided fight exclusively on this issue. We believe he would win the attention of the entire state on such an issue. And if the state can once be aroused there is no question that the Department of Forestry of the State of California will get its rightful place somewhere near the center of the state's activities, instead of being considered, as it too frequently has been considered in the past, a sort of side issue."

Recent extension of the California State Highway system through Humboldt County, has made the magnificent redwood forests of the northern coast easily accessible to the lover of nature, to the tourist, and to important industries dependent upon forest products. This extended use of the highway coming at a time of unusual activity following the war, has brought us to sudden understanding of the value and interest of these forests as unique wonders of nature, and to realization of the imminence of their disappearance before the requirements of this great lumber-using country.

The Save the Redwoods League was organized to assist in bringing about a better and more general understanding of the value of the primeval redwood forests of America as natural objects of extraordinary interest as well as of economic importance, and for the purpose of bringing into unity of action all interests concerned with the movement to preserve such portions

of these forests as should be saved to represent their fullest beauty and grandeur.

The plans of the League involve: (1) The securing of a belt of the finest redwood timber bordering the

northern highway, in the hope that this area may become a state park. (2) The obtaining of a considerable body of the most typical primitive redwood forest known, for the purposes of a National Redwood Park.

Determination of the precise limits of the particular areas to be selected for park purposes will be based upon a carefully prepared report furnished by the Committee on Redwoods Investigation, including the most competent authorities in America.

Mr. Mather has given himself wholeheartedly to support of the movement to preserve the redwoods, and in co-operation with a group of leading men representing all parts of the country, he is continuing to make clear to the public the national significance of these magnificent forests.

The movement to secure forest areas bordering the highway for purposes of a state park has received enthusiastic support from a wide range of organizations in California as well as from a great number of individuals concerned with the welfare of the state. It has been generally recognized that the redwood forests constitute a natural asset of this country to be ranked in importance with the great mountains and valleys as monumental works of nature. To have the northern highway traverse the groves along the streams means bringing the finest



A VETERAN, HOLLOWED BY THE AGES

This is the type which fell most readily before the flames, having been hollowed out and weakened by previous fires four or five hundred years ago.

of these trees to their fullest usefulness. There is reason to hope that the desires of those who have planned the preservation of these areas may yet be realized.

CALIFORNIA'S REDWOOD PARK

BY ARTHUR A. TAYLOR, SECRETARY CALIFORNIA REDWOOD PARK COMMISSION

WHEN Uncle Sam was figuratively still sitting by the stove whittling and talking about the weather, unaware of, or indifferent to, the scenic and esthetic importance of his domain, the state of California wakened to the hereditary value of its redwood forests and bought back at a price a fragment of the inheritance the Federal Government had sold for a song.

Late in the last century it was perceived that the redwoods were rapidly disappearing before the demands of commerce and the ravages of fire, and after an active agitation a law was passed authorizing the purchase of a tract of virgin forest in the Big Basin, Santa Cruz County, to be preserved and protected "for the honor of the state of California, and the benefit of succeeding generations."

The redwood tree, as is generally known, lives only in California and a small part of Oregon. There are two species, the *Sequoia Washingtoniana* of the Sierras, and the *Sequoia Sempervirens* (ever-virile) of the coast ranges. It is the largest tree and the oldest living thing on the earth. Many of the redwood trees of California were saplings when Hiram of Tyre was hewing the cedars of Lebanon for Solomon's Temple, and these trees are not aborigines, but descendants of a long line of ancestors, contemporaneous with the mammoth and the mastodon.

A sound redwood log was found in a mine in the state of Nevada 1,900 feet underneath the surface of the ground and some of the predecessors of the present day trees are preserved in the petrified forests of Arizona. A few of the juvenile redwoods of our era attain a height of 350 feet, and a girth of 60 feet. There are hundreds of redwoods in the

California Redwood Park of 250 feet in height, in diameter varying from 12 to 15 feet—and these were the trees threatened by the recent terrific fires. These trees are growing on the site of prior forests wherein the trees attained dimensions double the size of those now living. This fact is attested by the root rings left in crater-like

circles to outline the trunks of trees which, after an unthinkable longevity have died and decayed—been absorbed by the soil and dissipated by the winds. These mute mementos of the giants of other days are quite as impressive as the majesty of the living trees.

California selected the Big Basin in Santa Cruz County for its forest reserve, not only on account of the size, abundance and beauty of its redwood trees, but for geographical and topographical reasons.

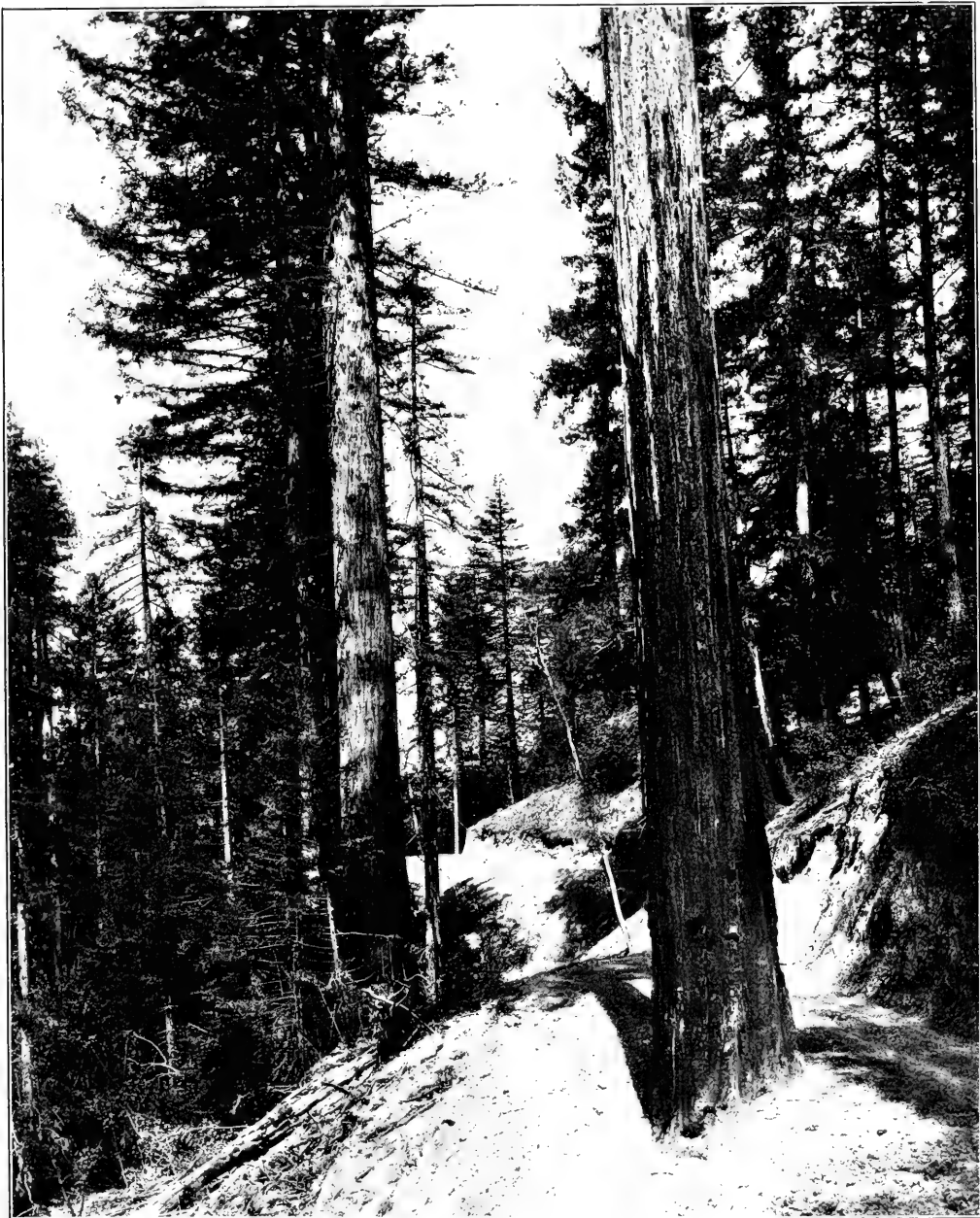
The park is easy of access from Santa Cruz, San Jose and Palo Alto, and within a three hours' auto ride from the cities about the bay of San Francisco. The Big Basin is an irregular fan-shaped area embracing about 14,000 acres surrounded by elevations of an average of two thousand feet above sea level. The dotted peaks about the margin range from 2,500 to 3,000 feet in height and the lowest gap of entrance is 1,600 feet. While these figures do not indicate high mountains, the altitudes are impressive because the ocean lies in view and the range of vision covers fifty miles or more landward, over a panorama of rapid diversity and beauty.

The main floor of the Basin where the largest and most interesting redwoods abound is at an elevation of 1,000 feet. Here are located at what is known as the Governor's Camp, the office of the Warden, and the Redwood Inn, with accommodations for visitors and campers.



GUARDING THE NEW GENERATION

Note the young redwood, offspring of the giant parent tree, guarded on each side by sentinel trees.



ALONG THE BEAUTIFUL AND INSPIRING REDWOOD TRAIL

Long ages before this road was built, these giants stood—sentinels on the hillside awaiting the coming of man, when he should know and claim them as his own. To protect and preserve them for coming generations is now man's solemn duty.

Hereabouts is a grove of stupendous redwoods, venerable for their age, world wonders for their size, staggering to the imagination in their lumber content, beautiful as statues in their symmetry—many of them—others, grotesque of form, rugged of exterior, living witnesses of their conflict with the centuries, through fire and tempest.

"And the great trees watch and wonder much. Surely a new race is coming on down there; men who measure their girth in love, not in greed, taking the place of creatures they used to dread more than rot and disease, or blasting, consuming fires. Through their branches the almost unbelievable message runs—'These men worship God with us.'"

Although California's forest reserve takes its name from the redwood, the peculiar and prevailing tree, yet its value as a park is augmented by the fact that within its limits are to be found nearly every variety of forest growth peculiar to the Pacific Coast.

The other trees include firs, pines, oaks of several species, the madrono, buckeye, California nutmeg, manzanita, while the shrubs and flowers of the park run well into the hundreds, and under the fallen foliage are fungi gardens of exquisite, half hidden beauty.

These trees and this forest entrance the beholder, and uplift with a conscious awe and sublimity, not aroused by man-made temples or cathedrals.

It took Titanic power and aeons of Time to make this place. Dr. J. C. Branner, President of Stanford University and one of the most famous geologists of his day, finds fourteen formations in this area and nine distinct and far-reaching geological disturbances recorded in the rocks, leaving the strata folded and crushed, impossible of clear definition, but affording a reason for the marvelous fecundity and variety of the vegetation. This Basin as finally left for man is a series of ravines and ridges. The creeks are numerous, fed by living springs which gush forth from mountain sides at altitudes of from one to two thousand feet. These springs are, some of them, clear as crystal, and many of them are impregnated with mineral

substances. The stream that flows past the Governor's Camp is called Opal Creek, on account of its color, due to mineral content. A chalybeate spring, to the west, is large enough and strong enough to transform the brook into a stream of liquid gold.

It makes a fall of about 60 feet in a shimmering shower of gold, of a beauty altogether beyond expression in words. It soon reaches another drop of about equal distance, the water changing in transit into copper color. Again it falls as bronze and after flowing a few hundred yards leaps over another precipice, a sheet of silver.

When streams fall a thousand feet in a mile of distance it is inevitable that there should be numerous picturesque cascades and these form no small part of the charm of this woodland.

The California Redwood Park is not only a sanctuary and a sanatorium for world-weary men and women, but it is a haven of refuge for birds and animals. No guns or dogs are allowed within its limits, and deer and squirrels show no sign of fear.

As Virginia Garland expresses it in writing, the trees in Sempervirens Park are looking down on a different manner of men, and they no longer dread the ax and the saw.

When acquired by the state the forest of the Big Basin was inaccessible except on foot or on horseback over a trail dating from the days of Indian occupation, and it required as much time to arrive from the town of Boulder Creek, twelve miles distant, as it does now to make the run from San Francisco



THE FAMOUS SANTA CLARA TREE

Awe-inspiring and impressive these giant trees stand—the oldest living things on earth—an ever-new source of reflection to men.

an automobile. The park is now reached over a well graded road from Santa Cruz via Boulder Creek, or from the Santa Clara side over the new state highway via the town of Saratoga, opened in 1915. An auto stage runs from Boulder Creek and also from Saratoga during the season. Private automobile tourists usually enter by one route and return by the other.

It is no disparagement of the forest or of the wonders of the redwoods to state that the trip thither is perhaps as attractive and compensating as time spent in the com-

panionship of the great trees. Travelers who have toured France and Switzerland and have had wide experience in estimating scenic values, declare that the charm and beauty and picturesqueness of this trip is not excelled. The scenery of the Santa Cruz Mountains approaches grandeur but it is not overawing. It is kaleidoscopic, a new angle of vision revealed at every curve in the road, but all its lines are graceful, its aspect never void of beauty.

The summit above Saratoga is gained at an altitude of 2,700 feet at Fairview. Here a most entrancing panorama is spread. Facing eastward, at your feet lies the

Mountains descending oceanward. The panorama appeals instantly to the artist. Comprehensive in its fifty miles of compass, sublime in its heights and depths and distances, exquisite (we use the word advisedly) in the tinting of the landscape, bringing within the vision the astronomical, agricultural, commercial, educational and industrial glories and beauties of Central California.

From this point to the heart of the forest is not more than five miles as the crow flies, but it is fifteen as the park highway runs, on uniform grades from four to six per cent. The right of way is 200 feet in width and forms a pan handle to the park, being under its juris-



THE TWIN GIANTS—OHIO AND HAVERFORD IN THE MARIPOSA GROVE

These two are among the most notable trees in the grove. The view of the cabin through the opening in the base of the Haverford and the whole condition of this tremendous base is not only most impressive but most convincingly indicates the great age of the tree and its mates.

Santa Clara Valley, town dotted, orchard checked, varicolored with trees, pastures, grain fields and the habiliments of a fertile valley. Beyond rises Mount Hamilton, crowned by the Lick Observatory, and to the northwest Mount Diablo. Northerly a clear day will give glimpses of the intruding bay of San Francisco, or if this is fog shrouded, the imagination can complete the suggestiveness of the picture. Facing westward before you are the seamed, sloping, evergreen ridges of the Santa Cruz

diction. Northerly along the crest of the mountain the road flirts with the boundary line between Santa Cruz and Santa Clara counties, alternately disclosing expansive views seaward or valleyward, an exhilarating experience to the sightseer. It then bends down the mountain side descending until it reaches the gap which marks the divide between the waters flowing to the Pescadero and those reaching the bay of Monterey at Santa Cruz. Continuing its winding it ascends to an altitude of 1,900

feet when it passes over the rim of the Basin, to reach its destination 900 feet lower at the Governor's Camp.

The way is partially through tall timber, partially along the open rock ribbed mountain side with outlooks upon the canyon of the San Lorenzo River and its tributaries, upon mountain peaks and ridges, and at favored points peeps of the Pacific extending to the horizon, a sea of molten gold, under midday sun, or a dim grey haze when cloud-veiled or fog-covered.

A guide post directs to a near eminence from which one may look down into the slopes and depths of the untouched, untraversed redwood forest, covering thousands of acres, beneath the eye. An evergreen sea more impressive than the one made of water, which impinges against the westward horizon.

If it is early season, the water courses will be outlined by billows of blooming azalias, with here and there a flash like fire, coming from some Tiger lily which has

but blending in a unison which is in tune with the Infinite.

The lumberman gazes with amazement upon the acre of standing timber, good for half a million feet of lumber. He computes the contents of a single tree which could be converted into ten cottages, and he is glad that these trees have been saved for him to see.

The true Nature lover finds every foot of this temple soil sacred. He walks with bared head, his vision is rapt, his voice is seldom heard. And the joy of it all is that this woodland, wonderland, is to be preserved, saved, perpetuated.

CHURCH BUILT FROM ONE TREE

BY H. E. ZIMMERMAN

IN Santa Rosa, California, is a Baptist church which will hold 400 people, built entirely from timber sawn from a single redwood tree. Everything used in the construction of this church was furnished by this one tree with the exception of the necessary glass and hardware. The spire is 100 feet high, and there is a pastor's study 12 x 20 feet, as well as a vestibule, toilet room and parlor

THE GIANT REDWOOD

By M. J. Riordan

When Babylon was riotous thy head
Was wise with years; when Bonaparte on cold
Helena's rock lay still thy heart was bold
As youth against the storm; no hair has fled
Of all thy leafy locks through age; the dead
Since thou wert young have swept in ranks untold
To immortality; straight as of old
Thou wait'st the generations still unbred.
Why build we monuments of crumbling stone
Or tawdry brass and bronze to mark a name
And spare mere memory to unheeding time?
It were far sweeter, though to be unknown,
To rest beneath green trees. Could marbled fame
Sleep softer bring though graved with sacred rhyme?

caught a sun ray. If you tarry in the park you can camp at your pleasure without cost, or abide in the inn at reasonable rates. Lodgings are in tents or cabins. At night a huge camp fire is a common meeting place, where song and story always abound.

Tomorrow you can take a hike over some trail through the recesses of the forest, following a stream, or climbing a ridge. The next day this experience may be duplicated in another direction, and there is distance and diversity enough to make a week seem short, especially if you are fond of locomotion by "shank's mare."

To the unaccustomed eye the trees look alike and the wildwood has a uniform aspect as a city seems like "all buildings" to the countryman, but when you get the Indian vision of the forest, you will discover that every tree has an individuality as distinct as that which distinguishes men and women. You will soon be striking friendships with these people of the woods, and find them companionable, the most soothing, restful, inspiring personalities you ever met. Every rill and ripple of flowing water, every cascade and rapid has a melody of its own,



THE REDWOOD TREE CHURCH

seating 100 persons. This church is 60 feet wide by 100 feet long, and cost \$5,000. Only two-thirds of the tree was needed for the necessary lumber. After the roof was finished it was found that there were 60,000 shingles left over. A sister tree to this one furnished employment for two years to two men in reducing it to shingles.

A CHRISTMAS SUGGESTION

Are you puzzled about the selection of Christmas gifts?

Why not give a year's subscribing membership in the American Forestry Association as a gift. It will cost you \$3.00, and the member will receive American Forestry Magazine for a year.

This will be an ideal Christmas gift for a child or an adult.

Send the money to the Association and a Christmas Card will be sent you to present on Christmas Day.

THE FOREST CODE AND THE REGIME FORESTIER

BY W. B. GREELEY, LIEUT.-COL. OF ENGINEERS, U. S. A.

THE "regime forestier" means to the French the sum total of laws and administrative decrees applicable to forests under all forms of public ownership. It thus actually governs about one-third of the forested area of France; but the public administration of this third, affording opportunity to standardize and demonstrate cultural methods in every section of the country, is the core of French forestry.

The requirements and protection of the "regime" extend to all state forests, to all communal forests which are adapted to forest management, and to the forested properties of public institutions like hospitals, charitable organizations, and ecclesiastical foundations. They may be extended to communal lands whose reforestation is deemed desirable by the Government. They are applied automatically to all forests and planting areas within the limits of national projects which are undertaken for the stabilization of sand dunes or for the checking of erosion on mountain slopes. They may be extended to private forests at the voluntary choice of the owner, but otherwise have no direct application in the handling of timbered lands in private ownership.

The basis of the "regime forestier" is the forest code of France, which stands today in substantially the form in which it was adopted in 1827. This detailed and com-

prehensive code is deeply rooted in the forestry laws of the old imperial days, particularly in Colbert's Ordinance of Waters and Forests of 1669, which dealt minutely with waterways, fishing, and hunting as well as with forests. Many penal provisions of the forest code are taken bodily from Colbert's Ordinance and preserve—in the liberty-loving France of today—much of the harsh and arbitrary conceptions of penal law characteristic of the times of Louis XIV. In this as in other respects, the code is a striking expression of the French attitude toward their forests—as a resource which the common law alone is inadequate to conserve and protect. Because of the ease with which the productivity of forests may be impaired, because of the long time required to restore it, once reduced, and because of the far-reaching public and economic interests at stake, forests stand apart from other forms of land and require a special code exceptional in its restrictions and in the severity of its punishments. French discussions of the code refer constantly to the necessity for restraining the "jouissance" (enjoyment or use) of forests by their owners in order that their national utility may not be destroyed. Nothing else in French jurisprudence is comparable to this body of special laws created for the conservation of their forests.

The "regime forestier" is applied today to about



A FRENCH LOGGING RAILROAD

These railways of 60 centimeter gauge (24 inches) are quickly built, the rails and ties being light. Somewhat similar roads were built for carrying ammunition and supplies to the troops and where there were woods they were easy to hide from enemy observation.

7,870,000 acres of forest in France, not quite one-third of her total forested area. 3,000,000 acres of this amount are the property of the French nation and their management sets the standards of public administration. The history of these state forests reflects the ups and downs of the fortunes of the French kings, of her political upheavals, and of her changing economic theories. Large forests in northern and eastern France were undoubtedly properties of the Roman emperors and were held later by the Frankish kings by personal right of conquest. The later kings, as the first feudal lords of the realm, held numerous forest domains usually burdened with old rights of usage acquired by the local rural communities. Forest ownership, in fact, became an attribute of royalty and nobility and was sought by the dominating classes of the feudal and imperial regimes as a bulwark of their prestige in the state. It still carries the stamp of social prestige in the French provinces—an inheritance from the days when the possession of large hunting preserves was a coveted distinction of the grand seigneur. In the course of the centuries the royal forests went through numerous vicissitudes from conquests, marital transactions, cessions to rebellious or lukewarm nobles, and grants to royal favorites. Certain of them became in time the property of the state, others remaining in the personal possession of the reigning family.

One of the first steps toward the conservation of public forests, which is of special interest in view of the seeming indifference of the times toward the future, was the Edict of Moulins in 1566, which declared that all forests owned either by the state or by the king in his own right were inalienable and—by inference—protected from prescription or seizure under any color of claim whatsoever. Although this decree was often abused by the kings themselves, through various fictitious engagements or contracts which amounted to the alienation of public forests, it undoubtedly had a conserving influence up to the time of the French Revolution.

With the outbreak of the Revolution, the royal forests were declared to be the property of the state. A law of 1789, placing all church property at the disposition of the nation, resulted in adding considerable areas of forest

to the public domain. Three years later the forests owned by emigres of the old nobility were confiscated by the state—but most of these were subsequently restored to their former owners. The first effect of the Revolution was toward the nationalization of forest resources, but counter currents soon set in. In the reaction from the abuses and usurpations of the seigneurs of the old regime, the rural communes were encouraged to take possession of forests under almost any pretext based upon entailed rights or old claims. The confiscated properties of the king did not escape, and the state lost heavily from the inroads of the communes into its newly

acquired forests. The Edict of Moulins was also formally repealed and large areas of state forest were sold outright under the individualistic economic theory of the times. The recorded sales of hardwood forests in central and northern France, for example, probably the most valuable part of the public domain, aggregate 880,000 acres. It is significant that every French Revolution was followed by fresh disposals of state forests. From the Revolution of 1789 to the establishment of the Third Republic, the attitude of the French toward their 'public domain' was strikingly similar to that in the United States during the period of active disposal of its public lands.

Under the Third Republic, the policy of France has turned definitely and aggressively in the opposite direction. Alienations of national forests have been restricted practically to small areas granted to various

communes as a means of liquidating long-established entailed rights, or privileges to take timber and fuelwood for domestic use. On the other hand, the state forests have been enlarged by plantations in the sand dunes and by the purchase and reforestation of mountain areas in connection with projects for the control of erosion.

A most interesting phase of public forestry in France and one of special suggestiveness to America is the communal forest. The French commune is comparable to the New England township—a self-governing, rural community of exact geographical limits. The feudal system developed a peculiar solidarity of interests among the members of these little communities. The system of



AT WORK IN OAK COPPICE

Many of these French workers still in uniform are engaged in chopping wood for fuel to aid in overcoming the coal famine in France this winter.

entailed rights in the royal and seignorial forests developed largely from the sheer necessity of meeting the needs of the local agricultural population for wood—for fuel, farm buildings, and implements. Entailed rights were usually held and exercised by the villages of serfs or tenants in common. They became community rights,



ROAD THROUGH A FRENCH STATE FOREST

A great deal of care and attention is given in France to the building and maintenance of roads, one of the features of France with which the American visitor is impressed.

so firmly established as to be a fixed and accepted factor in the forest legislation of France from its earliest development.

In the breaking-up of the feudal system and the overturning of the old order under the Revolution, these little communities asserted their old rights and claims so vigorously as to acquire many small tracts of forest and pasture land in fee simple. The history of the communal forests is a complicated one. Their acreage has been swelled from various sources, including community purchases in some instances. Following the Revolution, the acquisition of forests by the communes was largely antagonistic to the slowly developing policy of national conservation. But during the past half century, French policy has aimed steadily to harmonize and correlate the two forms of public ownership. Following the success in controlling sand dunes on the southwestern coast, the planting of many communal holdings in the sand plains of the Landes was required by special legislation, with state supervision and aid. 185,000 acres of communal forests were created outright by this co-operative enterprise. A somewhat similar policy has been followed in the French Alps as part of the effort to protect mountain slopes from erosion.

* There are practically no forests in France owned by the Departments, the political divisions corresponding to states in America.

The communal forests in France today aggregate more than the holdings of the state itself. And under the terms of the forest code, the great bulk of them are administered by the national service in accordance with the requirements of the "regime forestier." In other words, they form part and parcel of the public forests and meet the same needs in national economy as the timberlands owned by the central government.* The communal forests still serve their original purpose of furnishing supplies of wood for local use, particularly fuel. But under the careful supervision of the national forest service, they also produce quantities of large timber which are utilized for the general requirements of France. They furnished a fifth of the timber cut by the American Army. Some communes own and operate their own small sawmills. These forests are an important source of revenue for hundreds of French villages, reducing taxes and affording the means for constructing town halls, roads, and other local improvements. The situation in France would be paralleled if every village in New England or the Lake States owned 500 or 1,000 acres of forest, kept continuously in the best state of production, furnishing the timber locally needed, affording a substantial revenue for community purposes, and providing means for the steady employment of a number of its workers.

The forest code establishes the principle that all public



A CAMOUFLAGED ROAD

The French were particularly skillful in hiding their roads from the enemy flyers so that their transports to the front could continue without attention from the enemy artillery.

forests must be placed under a definite scheme of management, the main point of which is to fix the amount of wood which may be cut yearly without reducing the growing stock, or capital, and to prescribe the method of cutting so as to maintain the productivity of the prop-

erty. It is significant of the importance attached to the handling of public forests by the French that each forest plan must not only be approved by the high council of the Service des Eaux et Forêts and by the Secretary of Agriculture, but must also be authorized by decree of the President of the Republic. Board rules of management are laid down by ordinances supplementing the code itself. In administering the communal forests, the highest monetary return is the main consideration. The function of state forests, however, is declared to be the supplying of national industries with the classes of products which they most need, particularly large timber which may not be grown on communal and private forests because it may not pay the highest returns. The purpose of state forests is thus to supplement, as may be necessary, the materials produced in the largest quantities by communal or private owners with choice timber whose growing is long and costly. As a matter of fact, these distinctions have largely disappeared under the free working of economic laws in fixing the price for various classes of timber.

The working plan for the state forest of Gerardmer, one of the areas cut by the American engineers, illustrates the extremely interesting but simple technical methods of the French service. This is a forest of fir, spruce, and beech in the high Vosges. A revision of the old plan had been made necessary by serious windfalls and failure to cut the old timber at a sufficient rate (a characteristic result of French conservatism). The new plan begins with a resume of revenues during the past twelve years,* including the lease of quarries and of hunting and fishing privileges, the sale of tree seed and seedlings, and rents from mountain meadows for pasturage. Then follows an exact estimate of the stumpage, in two classes—large timber and immature or middle-aged timber. The normal growing stock (to be maintained without diminution) is fixed at 350 cubic meters per hectare, or about 29 thousand board feet per acre. This figure is not based upon calculations for the forest but upon general experience in forests of this type in the Vosges. In the same way, the yearly growth of the large timber is estimated at 5 per cent and of the smaller timber at 2 per cent. By these simple methods, the annual "possibilite," or permitted cut, is placed at about 785 board feet per acre, a figure which is to be exceeded for a time in order to remove a surplus of old growth.

The bulk of the plan is devoted to an exact description of the various divisions of the forest, as marked out on the ground, with the order in which they are to be cut during the ensuing thirty years. The entire forest is to be worked over in that interval under the selection method, which consists essentially in removing the larger trees to a number not exceeding the prescribed limit each year. The working plan terminates with a detailed allotment of funds for maintenance and improvements during the same period. These include the construction and repair of roads, the upkeep of five state sawmills, planting designated blank areas, cutting out brush which is

covering young trees in places, and maintaining a small fish hatchery.

The French state service manufactures its own stumpage to but a very limited extent. The lumber or logs, in such cases, are sold at auction. The great bulk of public timber is sold on the stump, following advertisement by printed circulars specifying the exact areas where cutting will be permitted and the estimated quantities to be removed. The sales are made by lump sum for the marked timber on a stated "coupe" at public auctions, in which the crier begins by naming a price far in excess of the value of the timber and then reduces it successively until he finds a taker. The forest officers seldom scale the logs after cutting, as is done in the National Forests of the United States. This is a weak point in their system, both because of the speculative element in sales based upon estimate only and because of the failure to obtain a definite and authoritative check upon their estimates.

As would be expected, the cutting is subject to extremely rigid rules enforced by heavy penalties. These are standardized in published regulations and are so thoroughly ingrained in the lumbering practice of the country that little difficulty is experienced in their enforcement. One of their interesting features is the requirement that operators furnish stated amounts for repairing the roads used in logging, for the maintenance of their splendid system of forest transportation is one of the most jealously guarded features of administration. The whole system of cutting in small lots scattered over a forest in accordance with the requirements of its working plan depends upon the highway system. As much as three per cent of the purchase price may be exacted for the upkeep of roads.

The French administrative ordinances contain detailed stipulations for secondary uses of public forests such as the extraction of resin, the barking of cork oak, the pasturing of grasslands, the operation of quarries, and the removal of peat or of sand and earth for industrial purposes. Such uses are permitted under a leasing system operated by the forest service. The rights to sub-surface minerals, however, are entirely distinct from the ownership of the land; and their development is controlled by a separate group of laws. These are applicable to all forms of land ownership in the country and are of interest to Americans in contrast with the mining laws of the United States and the innumerable complexities which they have interjected into our public land system. No land owner in France has, per se, any title or claim to subterranean mineral deposits; and conversely the holder of mining concessions has, in virtue of that fact, no right to the surface of the land beyond the areas actually used in his operations.

The ownership of underground mineral resources is vested in the French nation. The owner of the land may prospect for minerals as he pleases and may concede prospecting rights to others for any consideration which he chooses. Prospecting privileges can be obtained by outsiders on any land in France, regardless of its ownership, by administrative decree. Such decrees are issued

* These averaged about 73.3 francs per hectare yearly, or \$5.76 per acre.

upon the recommendation of the public Engineer of Mines and after the owner of the land has been given a hearing. They are usually limited to a period of two years and provide indemnities to the owner for injuries to the surface of the property. Mining concessions, following a mineral discovery, are awarded by decree of the State Council. The procedure for obtaining them is a complicated one. Hearings must be given to the owner of the land and to adverse claimants of the discovery; a detailed investigation of the merits of the discovery must be made by the National Department of Mines; and many restrictions as to the proximity of mining operations to buildings, enclosures, etc., must be observed. The owner of the land has no preferential rights to mining concessions; his claim, if one is made, must be based upon priority of discovery. The terms of each decree fix the

It has often been used as an argument against the alienation of public forests and in support of legislation for retaining public control of forest areas in one form or another. Although the wooden frigate has disappeared from the seas, the special provisions of law designed for its protection still hold. Representatives of the navy may put their special mark on any trees included in sales of public timber, which are needed for naval construction. The purchaser of the "coupe" must then cut and limb these trees without reimbursement. The navy takes possession of them in place and buys them from the Forest Administration under a scale of prices which is fixed from time to time by a special commission.

The most complicated and, in certain respects, the most significant features of the forest code of France are its penal provisions. As I have pointed out before, zeal for



GATHERING FUELWOOD IN A FRENCH FOREST

Whereas in the United States the removal of slashings after cutting of timber is an item of cost to the lumberman, in France people pay for the privilege of going into forests after a cutting in order to gather fagots. Gathering and sale of fuelwood is a regular industry.

duration of the mining concessions and the indemnities to be paid to the owner of the surface. These, in principle, are equivalent to double the normal income from the portion of the land which the mining concessionaire will occupy.

The old solicitude for an adequate supply of large timber for the French navy has an interesting survival in modern French legislation, although the practical necessity for it has largely disappeared. It recalls the days when the broad arrow of the English king was stamped upon the finest trees in the forests of New England. Dating from the forest legislation drafted by Colbert in 1669, the assurance of an abundant supply of large timber for the navy has figured largely in French forest policy.

forest conservation in France has resulted in carrying over into her modern penal code many of the harsh and arbitrary provisions of the "ancien regime." A fixed schedule of fines and imprisonments is applicable to violations of the forest code upon the sole verification of the fact that an offense has been committed. Considerations of good faith or mitigating circumstances are excluded. This rigorous protection of the public forests is taken almost bodily from Colbert's ordinance drafted in the middle of the seventeenth century and has resisted every attempt at sweeping revision because of the deep-seated conviction in France that forests stand apart from other matters of public concern and require extra legal measures for their preservation.

The maze of detailed prohibitions and penalties in the penal sections of the Forest Code is bewildering to the foreign student. Yet they throw much light upon French conceptions of forest conservation. For example, the code provides not only for penalties to the state (fine or imprisonment) and civil damages to the owner of the land for tangible loss or injury to his property but also for damages to intangible interests such as the disruption of a plan of management. The innocent trespasser who cuts green trees pays a fine, the commercial value of the stumpage cut, and a further sum representing the value of the trees to the owner for further growth and seed production. The fine for cutting trees over 20 centimeters in circumference is 50 centimes for each tenth of a meter of circumference for each tree, in the case of most hardwoods, and 25 centimes for other species. A lower fine is imposed if trees less than 20 centimeters in circumference or if limb or branch wood are cut. For every tree cut which has been planted or sown by hand, the fine is three francs, together with obligatory imprisonment for one month. The distinction between planted and naturally grown timber, however, ceases after the trees become over five years of age. If the wood is removed from the forest, added penalties are imposed of ten francs for each wagon-load, five francs for a pack-load upon an animal, and two francs for a man-load of fagots or poles. The difficulty in estimating intangible damages has led to the adoption of the rule that such damages shall be adjudged as not less than the penal fine. They may be as much more as the owner can establish to the satisfaction of the court.

While the admission of mitigating circumstances is forbidden, the courts are compelled to impose severer penalties in cases where an offense is repeated within twelve months, when it is committed at night, and when illegal cutting is done by the saw. In the last two instances, the purpose of the more severe punishment is to discourage trespasses under circumstances which render them difficult of detection. The difficulty of the forest service in preventing unauthorized grazing and the stress placed upon injuries to forest reproduction by grazing have led to exceptionally severe penalties for offenses of this class, involving obligatory imprisonment in most cases. This extends even to swine herders who have purchased grazing rights to acorn masts but whose pigs stray beyond the designated areas. The unauthorized introduction of animals into areas under the "régime forestier," whether they graze or not, is subject to an arbitrary schedule of fines. These range from 25 centimes to one franc for each pig, sheep, or calf and from 40 centimes to two francs for each ox, goat, or beast of burden. And it is especially noteworthy that the fines are doubled if the animals are discovered in woods under ten years of age.

The obvious principle of the forest code is to take no chances. Any person found in a public forest off of the ordinary roads with wood-cutting tools in his possession is liable to a fine of 10 francs and confiscation of his outfit. Counterfeiting the official marking hammer of the state service is punishable by forced imprisonment for

twenty years. A series of protective zones is established around the exterior boundaries of all public forests. Within 500 meters, no workshops, yards, or factories which fabricate or trade in wood can be established without special authority. Within a zone of 1,000 meters, furnaces or fuel-using factories are similarly excluded; while sawmills are forbidden within a zone of 2,000 meters except under permit from the forest service. The intent of these drastic restrictions is to prevent the existence of commercial establishments in locations where timber cut illegally might be quickly or readily consumed, disposed of, or changed in form so as to render detection of the trespass difficult. The penalties for unauthorized establishments within the prohibited zones are fines ranging up to 500 francs, enforced demolition of the structures, and, in extreme cases, confiscation of the timber found in them from whatever source. When sawmills are authorized within the 2,000-meter zone, they must notify the forest guard of each lot of logs which they are to receive and hold it for his inspection and marking before it can be manufactured.

It requires but very slight acquaintance with the personnel of the French forest service to appreciate that this penal system is far more onerous on the statute books than in actual enforcement. While the laws and penalties savor of the seventeenth century, their present-day application is eminently human and modern. This could not be otherwise in view of the tact and diplomatic skill of the French forest officers, practically all of whom, rangers and guards included, receive special training for their functions; and particularly in view of the personal individualism and latitude with which the French official usually handles his local situation. Particularly during the last fifty years, the Service des Eaux et Forêts has sought to overcome the antagonism of local populations to the state forests and forest policy; and the terrifying list of penalties represents today a latent measure of last resort rather than an active instrument in current administration.

This practice is, indeed, strongly supported by provisions of the Forest Code itself. One of the characteristic expressions of French temperament and administrative instinct in the code is the wide authority given to administrative officers to compromise its violations. Before judgment is rendered, such compromises can dispose of the entire matter, even when the offender is liable to imprisonment. Following a judgment, pecuniary penalties only can be compromised. The Forest Conservateurs, who are usually in charge of a Department, can compromise cases where the fines and damages do not exceed 1,000 francs. Even the most serious violations of the code can be settled out of court by the Secretary of Agriculture. In actual practice, by far the larger proportion of trespasses and other offenses are disposed of in this direct fashion.

American foresters find special interest in the provisions of the Forest Code dealing with fire. To light a fire within 200 meters of any forest under the "régime" is prohibited, except on the part of the owner or of per-

sons authorized by him, or in the case of fires necessary in the exercise of public franchises. A fine of from 6 to 10 francs is imposed for refusing or neglecting to render aid in fighting forest fires when called upon to do so. The French point of view toward forest conservation is well illustrated by the provision that while the incendiary firing of cut forest products is penalized by imprisonment at forced labor for limited periods, an incendiary fire in a forest is punishable by imprisonment at forced labor for life.

A special fire code has been developed by recent legislation for the forests of Maures and Esterel, bordering the Mediterranean coast, whose dry conditions and consequent fire hazard are comparable to our southwest. All owners in this region are prohibited from the use of light burning to destroy underbrush, a practice formerly common in connection with the harvesting of cork oak bark. All fires within 200 meters of any area of forest or brush land are forbidden, on the part of the owner or anyone else, from June first to September thirtieth. The Prefet (Departmental governor) alone may, upon the recommendation of the Forest Conservator, permit charcoal burning or fires for other industrial purposes within the restricted areas during this hazardous period. Any owner of forest or brush land in this district can compel an adjoining neighbor to clear and maintain jointly, at the limits of contiguous holdings, a fire trench which must be kept clean of herbs, brush, and resinous trees. In default of a friendly agreement, the width of such trenches, within limits of 20 to 50 meters, is fixed by the prefet. This law has been widely employed by the state to protect the borders of public forests. Similarly, railways traversing forest or brush lands in this region can be required to clear and maintain fire breaks 20 meters wide on each side of their right of way. The railroad must make its own settlement with adjoining land owners who are affected. One of the most interesting and constructive features of the fire code for southwestern France is the offer of state aid to communes in the construction of roads designed to complete the system of fire defense. The assistance offered is 3,000 francs per

kilometer of road, probably half of the average cost of construction. The real value of the "regime forestier" to France does not consist in its elaborate and painstaking legal code. It can be gauged only in appreciation of the administrative skill of the French, of their practical genius for co-operation, and of the high intelligence of many elements in the rural population of the country which has resulted in extending the technical practice in public forests far beyond their own limited area. The public forests form but a third of the forested land in France. But they and their staff of trained officers are present in every section. Their administrative methods set the standards, and their results demonstrate good forestry practice to every timber owner in France. How to cut and

reproduce timberlands has thus become common knowledge. It is the rule to find the local Conservateur des Eaux et Forêts the recognized authority of his Department on forestry matters, the leader in discussions of its local problems, the adviser of forest owners of all classes who come to him for counsel. This process has led indeed to forms of direct co-operation, in the special recognition given to associations of forest owners and in the opportunity to place private holdings under the technical methods and legal protection of the "regime" at cost. The "regime forestier" is thus the core of French forestry.

This fact points out a clear road to the United States. In the beginnings of our forestry development, public forests under technical administration should have a dominant part. They should be present in every section. They should be identified with its local problems of fire hazard, of timber growth, and of provision for future needs. They should develop the silvicultural practices adapted to our varied types of forest and make them common knowledge by concrete demonstration, the most effective of all educational measures. We will do well to adopt on a large scale the admirable French institution of communal forests. We need State Forests in every state and we need a large expansion of our National Forests, to include every forest region in the Union. In democratic America as in democratic France, a corps of public forests will be the key to effective progress.



CHARCOAL PRODUCTION

This is an important forest industry in France and is a means of utilizing a great deal of small material. In the French forests because of this close utilization, very little is wasted.

A TRIBUTE TO DR. J. T. ROTHROCK

FORESTERS all know and honor Dr. Rothrock for his life-long devotion to forestry and to public service.

The State of Pennsylvania owes to him the original establishment of a free sanatorium at Mont Alto for the open-air treatment of tuberculosis. This project, dating from 1902, has grown under the encouragement of the State into a large and efficient hospital, and is being managed and supported by the State, through the Department of Health.

Dr. Rothrock's fellow-members in the Chester County Medical Association, with the co-operation and support of the State Department of Health, arranged for the placing of a bronze tablet on a large boulder in front of the ward for children at the sanatorium, and appropriate exercises were held at the sanatorium on Thursday, October 9, 1919.

There were present at this meeting a number of Dr. Rothrock's friends and admirers and addresses appreciative of his great record of altruistic and self-denying devotion to public service were made by Colonel (Dr.) Edward Martin, Commissioner of Health of Pennsylvania; Dr. Henry S. Drinker, President of the Pennsylvania Forestry Association; Dr. Lewis H. Taylor, of Wilkes-Barre, and Dr. Joseph Scattergood, Chairman of the delegation from Chester County, who presided at the ceremonies.

The inscription on the tablet reads as follows:

Joseph Trimble Rothrock, M. D.,
Botanist, Soldier, Explorer, Pioneer in the cause of Forest
conservation in this Country
established the first free Sanatorium
for the open-air treatment
of Tuberculosis in Pennsylvania
at Mont Alto in 1902.

This tablet was placed here
as a token of Honor and
affection by his fellow-members
of the Chester County Medical
Society in 1919.

In responding Dr. Rothrock spoke as follows:

Few, if any, public institutions, which have achieved success, owe their origin to those in whose hands they came before the world. This great sanatorium is no exception to the rule.

In 1877 a legacy left by F. Andre Michaux to the American Philosophical Society, for the promotion of Forestry in America, became available. There was in Philadelphia, still active and vigorous, a venerable, distinguished member of the Philadelphia bar, a life-long, public-spirited citizen, the Hon. Eli K. Price, who had for years witnessed with anxiety the ruthless waste of our forests. He had recognized the fact, as few others had done, that we were destroying the proper proportion of forest to cleared land, and dooming a large portion of the state to a barren condition. He, at once, called that legacy into use, and had instituted a course of lectures in Horticultural Park in Philadelphia, which became popular under the name of the Michaux Forestry Lectures. It is well to note that at that time the word "Forestry" hardly appeared in our American dictionaries. Those lectures became one of the most active forces in leading up to the Pennsylvania Forestry Association, which was the direct cause of the creation of the State Forest Reservation Commission in 1893, which Commission has developed, or led, to the development of our splendid State Forest Reserves. The original impulse was due to the Hon. Eli K. Price.

Your speaker was, in 1901, the head of the Forestry Commission. The fresh air treatment of tuberculosis was then partly possessing the public mind. It was nothing new to me. I had inhaled it from my youth up, for my father, an honored country doctor, had, a half century earlier, made the discovery that those of his tubercular patients who lived most in the open-air, lived

longest. I had noted, in 1873-74, the effect of open air upon two tubercular patients under my care in an exploring expedition operating in the mountains of Colorado. The thought flashed upon me that I had under my control, as Commissioner of Forestry, 600,000 acres of State land, which by right of purchase belonged to the citizens of this State! Why, therefore, should any of them be deprived of a chance for life because he could not go to Colorado? In my travels I had learned the common report that on this mountain no case of tuberculosis had ever developed, though on the other side of the valley it was rife. Was it true? If so, what was the cause?

Without warrant of law I determined to make a trial here of a camping ground, to which the sufferers might come, board themselves, and drink our pure water and inhale, without cost, the fresh air that belonged to them. Such, in 1903, was the origin of this camp. There is still here, in the capacity of matron, one of the two first owners, a lady whose husband, Mr. Andrew Klee, was restored to fair health, only to die several years later by a heart trouble. The success and the popularity of the camp led to the question—how was it to be maintained? We had not a penny of aid from the State. There was none in sight from any source!

"In 1903 there was a meeting of the State Federation of Pennsylvania Women in Carlisle, at the close of which a large number of delegates visited the camp." As a result of this visit, Mrs. Scarlett, then vice-president of the Eastern District, was enabled to contribute from that District sufficient funds to prevent the closing of the camp, which, at one time (from lack of fuel) seemed inevitable. I wish here to add my grateful acknowledgment of that timely assistance, and to say that one of the representatives of the Federation, Miss Mira L. Dock, is with us today. Her constant, effective assistance, her interest in the camp, has never ceased. Without it we would have fared hard.

So far as I am aware, no sufferer was ever allowed to leave camp for want of aid to keep him here. In 1907, on the request of the Forestry Department, the care of the infant sanatorium was transferred to the Department of Health. A new, larger career for it became possible. The then Commissioner of Health, the late Dr. Samuel Dixon, recognized at once the peculiar advantages of the situation and the vast importance of the work begun and possible here. I am not sure that any extensive plans relative to sanatoria similar to this, under state direction, had been earlier considered by him—but I do know that he promptly resolved to push the work on a larger scale. The country was then in the flush of the open-air treatment.

The policy of Dr. Dixon was abreast of our knowledge at the time. He and his able coadjutor, Dr. Johnson, built up a great institution here, the fame of which rendered the creation of the sanatoria at Cresson and Hamburg not only easy, but necessary.

This institution has safely passed through its period of probation and with new life, with a saner policy which has grown out of past experience, it starts upon its career under its new, distinguished chief, Colonel Martin, whose record yields abundant promise of larger usefulness in the era upon which the world seems about to enter. His keen vision of possibilities centers upon the young cases—many of those may be saved and may be re-created, and restored to perfect health.

It is a disgrace that the children of a vigorous ancestry should in this land of wealth, abundance and opportunity, have degenerated physically until they were only fifty per cent fit to defend the country in its hour of need. It is intolerable that such a condition be allowed to continue. There is but one help for it, namely, to make obedience to the laws of health a rule of life. This can only be brought about by training from childhood up. Our State Departments of Health and Education have this vision in full view and they never before were in such perfect co-ordination to realize this great desire.

May I make a brief personal statement? I would be a strange man, indeed, if I did not appreciate the honor the Chester County Medical Society and the State Department of Health have conferred upon me and upon my family name. I sincerely thank you, and gratefully accept it, with the reservation that I can claim no share in the results shown within the sanatorium enclosure, further than to have recognized the value and the promise of the location, and to have had, without warrant of law, enough courage of my convictions to invite Pennsylvania tubercular sufferers out on to their own land to get relief; and that I helped beg enough money to keep the camp alive during its three years of infancy, until the State adopted and cared for it.

As I look over the State charitable institutions, I can see that this one is especially fortunate. It is located on a great State forest reserve where, as the generations come and go, its inmates will breathe air filtered and purified by miles of living foliage, and drink water from the very fountain heads of streams, as these issue, uncontaminated, from the mountain heart.

LANDSCAPE ARCHITECTURE IN OUR NATIONAL FORESTS AND PARKS

BY S. R. DeBOER

LANDSCAPE ARCHITECT FOR THE CITY OF DENVER

IT is only in recent years that organized effort towards better human development has reached the stage of recreation. Terrible crowding—overcrowding—in our large cities primarily led to the establishing of city parks. They were the necessary outcome of the tenement problems. Man has lived in nature and close to nature until only a few centuries ago. The call of the wild is not extinguished, only weakened in him. Too much crowding by buildings, with their smoke and soot, created a reaction, and he demanded open spaces where he could enjoy nature to a certain extent.

But there was no question of actual recreation involved in the beginning. Lawns were carefully guarded, flowerbeds and trees were for distant observation only. It gave some satisfaction but soon proved to be insufficient. For man, imprisoned in his city walls, lacked more than just the attraction of nature. In primitive life he had enjoyed the freedom of the wilds, his muscles had been in constant use. Now with his rapidly growing civilization, with machinery taking the place of muscular work, his whole physique had weakened and his brains had

grown beyond bounds. He needed more than just a park to look at, and especially did he need it for his children, who, growing up on asphalt streets and concrete sidewalks, missed the open meadows and the forests on the now building-covered farm. And so the park lawns became play meadows—under the trees play areas were set aside. Boating, swimming, skating and all athletic sports entered the once so carefully guarded quiet park scene.

We are in this stage now—the stage of recreation for those who want recreation. Or better, I should say, we are just leaving this stage and passing into the next stage of development. Man, under the pressure of his rapid evolution, in twenty years has outgrown this new idea, embodied in the city playgrounds. Like the original park ideas, it will have its place, will become even more valuable, but it also is insufficient. Leaders of thought have already pointed the way. Universal physical training must become the next step, compulsory physical training like universal mental training already is and has been for many years. And in this system of physical



LOCATING A CAMP

The Wapiti Camp Grounds on the Shoshone National Forest offer much attraction to the lover of the out-of-doors.

training the National Parks and Forests will likely play an important role. And here it is well for us to be thankful for having a government which in its park and forestry policy has already shown itself to be a leader, rather than one which reluctantly drags along the rear end of civilization's procession. To be sure, national parks were set aside as places in which the most beautiful scenes of the country are preserved for posterity, and only secondarily for recreative purposes.

But under the tremendous stimulant of the European war, we have begun to realize that we had not done everything there was in our power to do for those boys of ours who gallantly took up the challenge of autocracy and fought the victory of freedom. We have realized, and very late at that, how large were the numbers among these boys, who were physically unfit to join their comrades and had to be sent back to the homes they had left so enthusiastically. And there is the task we must set to work on now. We must cure these unfit, probably, but more than that we must stop raising the unfit.

Universal training — not

for armies, not for killing, but for the higher development of man and woman, is already knocking at the door. In a very few years it will become an established fact.

These few remarks about the growth of our civilization were necessary, in order to better approach my subject. For though our national forests were set aside for economic reasons, be they for lumbering purposes, for water conservation or otherwise, and though the national parks were set aside for the conservation of scenic beauty, they both give the nation service in recreation. I do not want to belittle the work done in developing the economic

value of our forests. Inestimable is the value of the work carried on in this direction, value for the present as well as for the future generations, and still greater good will come from these reserves as the vital point of a nation's health and energy is given a place alongside the economic interests, and great progress in this direction is being made.

Theoretically there is a boundary between the national forests and the national parks. There is a difference of purpose, but to the visitor they are both alike. The national forests contain so many places of scenic beauty that to the visitor it is immaterial whether he is in a

national park or forest. He enters both with the same feeling of reverence and security created by the knowledge that these beautiful spots are protected through him and for him by his government.

There are places in the forests, valuable for economic purposes only. There are others valuable for recreative purposes more than for anything else. And there are large areas valuable for both alike.

Landscap architecture may not have any suggestions for the economic sections;

it does have a few ideas for the recreative areas.

For years the slogan has been in cases of mountain and other wild scenery "Leave nature alone." The landscape architect has been mistrusted in such places—a mistrust probably caused by the number of exotic designs which have been copied and transplanted into our country. There is a fear that if our mountain regions, with their native scenic beauty, are turned over to the landscape designer, he will fill the mountain tops with stone civic centers, with ornamental fountains and maple trees. And still this is an unfounded distrust. For the man, who through his training and artistic development

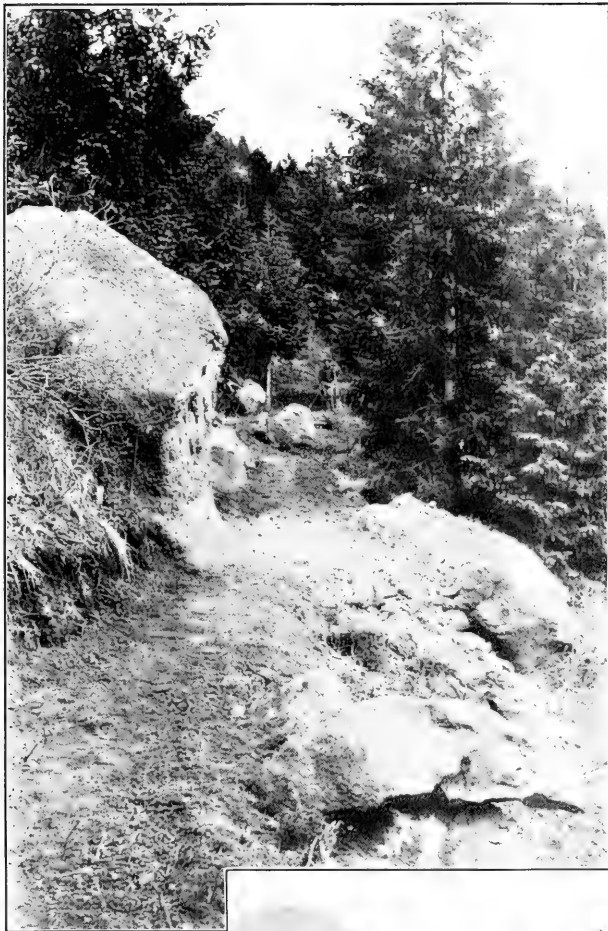


A COOK WHO TAKES HIS JOB COMFORTABLY

Domestic relations are reversed and it is father who is doing the housework in this little family scene. The picture is taken in the Municipal Camp, Denver Mountain Parks. Such tents may be rented from the city of Denver for \$2.50 a week.

On the Trail

Not the least difficult thing in making the national forest's recreative values utilized is to get people actually into the forest. There is too much rushing through after the style of the auto fiend mentioned by Mr. DeBoer "grinding out the scenery." The photographs shown tell of two things. First, that the need for recreative development is recognized by the United States Forest Service and is being taken care of and, second, this is a step to aid that movement which is gaining greater momentum continually—that is, getting into the forests on foot or horseback so time may be had to enjoy the beauties of nature. These pictures were taken by Supervisor A. M. Cook and show sections of the Pikes Peak Bridle Path, a scenic trail to the top of Pike's Peak. This trail is distinctively a recreative trail, is laid out according to good engineering and landscape principles and fills a long felt want for an attractive and safe route for pedestrian and burro traffic to the top of



the peak. Many other projects along recreational lines are under way but these pictures will give a very good idea of what is now being done and what may be expected along the line of recreative trail work in our national forests.
—A. H. Carhart.





ON THE UNCOMPAHGRE NATIONAL FOREST IN COLORADO

Where the Bear Creek Trail winds like a silver thread around the face of the cliffs.

can create landscape beauty to harmonize in other places, should know enough to properly guide that work in natural surroundings. For development work goes on whether it is studied from an artistic point of view or not, and in places where this point of view might have some value there is no other professional whose line of study and experience fits him better to give advice.

To come back to the "Leave nature alone" idea. What does it mean? What does nature do if left alone? The strongest creatures, be they strong by mere brute strength or by better adapting themselves to their living conditions, the strongest creatures, either animal or plant, will survive and crowd out the others. The willow clump will spread over the open meadow and crowd out the birch, the alder, the honeysuckle and the dogwood. Aspens, beautiful though they are, will

quickly fill the fine meadow you had loved so well a few years ago. Cattle and sheep, for they are included in the "nature" of the slogan, eat and pull the wild flowers to a dangerous extent. Douglas fir and lodgepole pine will cover large areas to the exclusion of silver cedar, yellow pine and other picturesque trees. Mistletoe destroys the pine trees and in general weeds if left alone will soon become pests.

It is well to leave nature alone, as far as it goes. No doubt it is better to leave her alone than to destroy her. But a still better way, and much better at that, is to aid nature along. In places where beauty can be considered—and it seems with our recreation ideas that in places it should be considered—roads should be built—not from the standpoint of utility alone—but should be designed so as to show the best scenic points of the area. A road may lead around the head of a valley, and if there is a snowpeak visible over the length of this valley, nature may be improved occasionally by cutting down a few dozen trees to open up the view. Or the road may lead by a large cliff rock, which until now had been hidden by tall willow growth and could easily be partly cleared and made visible.

Or lookout points can be made accessible by narrow roads or trails. There are a hundred and one objects which may become objects of beauty in such a tract. Open yellow pine forests may become fine camping sites, dense aspen plantings may be made of great interest, some colony of rare plants may even be worth while to lead a road by them. A creek may be crossed at a picturesque bend, or on a large meadow the road kept to one side to prevent the open natural meadow from being cut into two small strips. Beautiful old trees may be



ON THE PIKE'S PEAK BRIDLE TRAIL

A type of trail that is being built by the Forest Service so as to make the forest more accessible to the large number of tourists who visit the mountains annually.

brought into better picture by removing all tree growth in the neighborhood.

There must be sections in the national forests which have little economic and great scenic value and such sections could be treated in this way. Especially near towns and cities or places of easy access from transportation points this treatment could be carried out. In a general way the national parks could be improved this way. Road lines should be laid out with due regard to engineering problems of course; poor grades and lines are inexcusable no matter how beautiful the scenery. After the roads are built a skeleton of the park is there, and the work of encouraging nature can begin. In places where wild flowers have been largely destroyed through

bines are already becoming scarce, and if you have seen the auto loads of these flowers taken from their shady nooks to be wilted away in some tourist's care, this will not surprise you. If our national parks are to fulfill their primary purpose of preservation, they must be saved from the danger of overcrowding, and this again can be best done by putting at the disposal of visitors other areas outside of the real gems we want to save.

I should like not to be misunderstood on this point. These parks should be for recreation and recreation of the masses. I would even willingly sacrifice the last flower, be it columbine or painter's brush, or Mariposa lily, if these flowers aided in adding interest to the life of some poor tenement child. But it is not these very



OBSERVATION POINT ON PIKE'S PEAK.

Looking down Ute Pass, in the Pike National Forest, from the automobile highway, a magnificent panorama spreads out before one.

natural processes or by tourists, they can be reintroduced by sowing their seed. In other places where the flower varieties are limited or crowded out by undesirable weeds the former can be encouraged by keeping down the weeds and plants which are not wanted.

To a certain extent these recreative areas in the national forests have an advantage over the national parks. For we must not forget that the recreational work is as much a sideline for the national park as it is for the forests, and that the parks were not created for the monetary benefit of hotels and transportation companies, but primarily to preserve their unique scenic beauty to posterity. There lies a danger in too great a popularity for these parks. In some parts of the Rockies wild colum-

neely we bring out by extensive advertising, and expensive hotels. They only attract the leisure class, the class which can enjoy nature everywhere on earth, who sit on hotel porches and have the scenery brought down to them at so much a dozen.

Easy transportation to our nature reserves for those who need them the most is the essential problem in this respect. Cheap transportation; auto roads, well built, are of immense value. But not even they reach the poorer class. And there again is the danger of the auto fiend, who grinds out the scenery at so many miles per hour. He can pass the same road a dozen times and never notice the little beauties you had anxiously preserved, but also never failing to grumble over the little



THE SKIING COURSE, GENESEE MOUNTAIN, DENVER MOUNTAIN PARK.

This exhilarating sport calls for much practice before perfection is attained and lots of fun is had by the amateur and at his expense.

hole you forgot to fill at some bridge approach. Main trunklines for autos are of the greatest importance, but I do think that great good could be done by building secondary roads with limited speed and trails for those who prefer a slower way of enjoying the views.

As a counterweight against expensive hotel rooms, auto camps have come into existence. Rather than be locked up in a hot stuffy room like the one he left in Kansas, the visitor of these camps will camp out in the open. And he shows much more appreciation for our scenery and, for this reason if for none other, should be encouraged.

This last fall, while roaming through the yellow and golden aspens, the green firs and pines, the red and purple scrub oak of our Pike National Forest, the thought occurred to me how many frail bits of young humanity, now starving for air and light and interest in life, could be grown up to sturdy citizens in the invigorating air of the Rockies. Instead of growing pale in the shadows of the metropolis, instead of being nerve shocked little victims of rapid transportation systems or weak-kneed, vice-ridden alley inhabitants, they could be

brawny, tawny, husky youngsters of the woods. Camps for children, camps for convalescents, camps for all people who want to enjoy the mountains and cannot afford the expensive hotels seem to me the logical followers of the auto camps. These camps should not be crowded together but scattered along lines of transportation which are cheap and able to handle large numbers of passengers. They should be within visiting distance perhaps of places of natural grandeur, but should not be close to them no more than any hotel, no matter how expensive it might be, should be allowed to create a false note into the well conserved beauty of the place.

To come back to my title, landscape architecture then can aid in those parts of the national forests and parks where aesthetic values are to be considered and where recreation can become part of the general policy. In addition to this it can be of service in applying town planning principles to laying out summer colonies, camping grounds and the like. And last, but not least, it can be of aid in preserving wild vegetation and in encouraging rare plants which, under civilization's foot, would soon disappear.

FORESTERS EDITION

For the benefit of foresters and lumbermen, and also others desirous of technical and semi-technical articles on forestry, a Foresters Edition of AMERICAN FORESTRY will be published each month.

This edition will contain technical and semi-technical articles in place of the more popular articles on birds, shade trees, memorial trees, etc.

Members may have whichever edition they wish. The main edition will be sent as usual to those who do not notify the Editor that they wish the Foresters Edition.

NATIONAL FOREST PLANTATION UPON PIKES PEAK

BY SMITH RILEY, DISTRICT FORESTER, DENVER, COLORADO

YOU have heard the story of the man who saw a little child clapping her hands and jumping with joy near a small tree. The man called the mother's attention to the child's happiness, whereupon the mother said: "She may well be happy because it is the first tree she has ever seen."

Imagine your world without trees. Think of those areas in which you delight without trees. Or better still, think of those mountain areas with which you are familiar where fires have completely killed all forest growth. The thousands of people who visit Estes Park in Colorado

is said to be sixty-five million dollars. No large sums have been made available by Congress to reforest the denuded lands within the National Forests, so that the acreage planted each year has been extremely nominal and the work is of an experimental character.

In picking the areas in the National Forests where planting is to be carried on, extremes of conditions have been sought so that this early, restricted reforestation would in the years to come serve to point the way in carrying out more extensive operations. One of the areas chosen lies upon the slopes of Pikes Peak in Colo-



PLANTING IN ROCKY COUNTRY

Denuded country near Pikes Peak Auto Highway planted with yellow pine in 1912. This picture shows the rough character of a greater part of this country. Old snags of the former timber stand among the rocks.

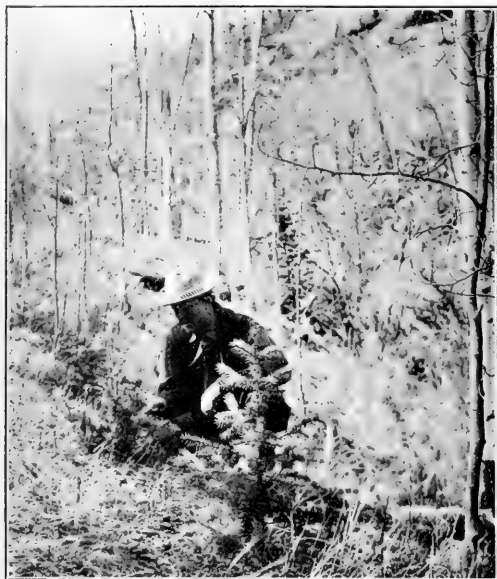
each year are familiar with the extensive burns upon the east slope of Long's Peak. Can anything be more ghastly than the path of one of these consuming fires? It is like the wiping out of all life which impresses one. It is like the battlefields of France. Passing through one of these burned areas is depressing in the extreme to many people who see upon all sides the skeletons of once superb tree life bleached white by the action of winter storms.

It is estimated that out of the 160 million odd acres of National Forests there are seven and a half million acres in need of planting or seeding to re-establish tree growth. The yearly loss to the nation in forest products from lands suited only for the production of timber and now

rado and includes the fire denuded portions of those watersheds from which several towns, including Colorado Springs and Manitou, secure municipal water. A reconnaissance study has shown there are some twelve or fourteen thousand acres from which the forest growth was swept by fire in the early days before the growing demand for water brought realization of the high value of tree growth as a water conserver. In addition to the forest products which can be produced from the lands and the value of the tree growth as a water conserver, there is the high value of establishing trees eventually to heal the ghastly fire scars upon the mountain slope, as Colorado Springs and Manitou, two cities closely related to

each other, represent one of the greatest tourist centers in the West today.

The conditions of the locality were severe for planting. The uneven distribution of moisture, high dry winds of spring and summer and also in winter when the temperatures are low, the lack of soil over much of the area and the movement of the soil on the steeper slopes made up these difficulties. The soil, composed of large particles of gravel, comes from the decomposition of



FIR AND ASPEN

Douglas fir planted in 1901 under aspen in a bottom and on a north slope near Pikes Peak Auto Highway. The aspen protects the fir until it has become established, after which the fir pushes through the aspen and crowds it out.

coarse-grained granite which forms the mountain masses of the Pikes Peak group.

A careful study of the reforestation problems upon Pikes Peak was made by Mr. W. J. Gardner in the summer of 1903. This study was very complete and weighed the difficulties to be overcome in successfully establishing tree growth upon the barren slopes. One very interesting point brought out in this study was the date of the fires which devastated such large areas in the vicinity of Colorado Springs. From the age of the young tree growth and the scars upon trees injured by fire and yet not killed, Mr. Gardner determined that a greater part of the area devastated had been swept by a conflagration or a series of fires between the years 1850 and 1853. This date is interesting as it shows the time which has elapsed since the destruction of the forest growth and how slow must be the return of forest growth to such lands by natural means. In short, the high demand for all waterflow from the area and the recreational use then being made and that which can be expected in the near future, combined with the value and

use of all forest products grown upon this potential forest land so immediately accessible, justified not waiting for natural reproduction but establishing such growth by artificial means.

The first move was made in the choice of two areas for nursery sites where the trees for field planting were to be grown. Thinking it was best to produce the trees under the same conditions in which they were to be planted, two nursery locations were chosen high on the big mountain, the land cleared, shade frames erected and seed sown. This work was begun in the spring of 1905. This same year 50,000 yellow pine seedlings were brought in from the Halsey nursery in Western Nebraska and planted in Clementine Gulch, about two and a half miles from one of the nursery sites. There are no records to show what weather conditions prevailed at the time or followed this planting. A careful search over the area in the fall of 1907 resulted in the discovery of but one seedling alive. The reason for this practically total failure was given as largely due to the fact that seedlings raised at Halsey were not able to withstand the sudden change to the higher altitude. It was proved later that seedlings

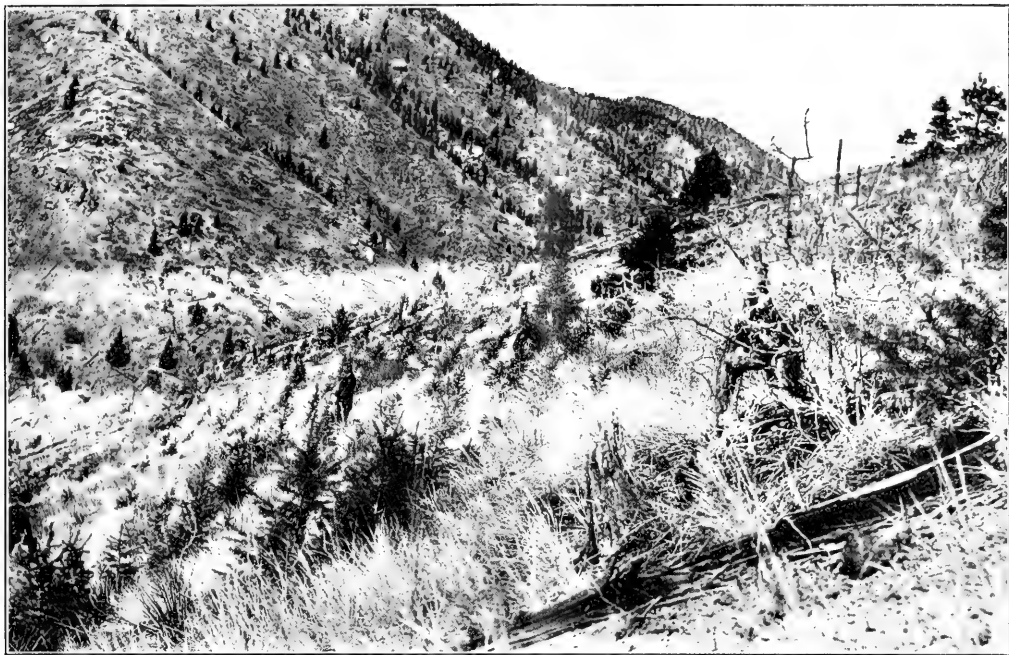


THRIFTY PLANTED YELLOW PINE

More of 1912 yellow pine along Pikes Peak Auto Highway. Trees now thoroughly established and prepared to push out rapidly.

of any sizes or from any other localities with markedly different climatic conditions, were not strong enough to survive the rigorous conditions found here; that, in fact, it would take transplants of the more vigorous type to produce results.

Experiments with the nursery areas chosen showed beyond a doubt that while there was some advantage in growing the plants under the same conditions in which they would be set out, many points which would offset



A DOUGLAS FIR PLANTATION

Douglas fir planted in 1906 in Bear Creek Canyon near Colorado Springs. Averages 3 to 5 feet in height. The scattering growth of jack and yellow pine on the opposite side of the canyon has been sixty years coming in naturally.



TREES WILL GROW HERE

Yellow pine planted in 1912 near Pikes Peak Auto Highway. Stub of Douglas fir in center, and rocky outcrops show in many places. Yellow pine makes a slow growth at first but once established it grows rapidly on the proper site.

this advantage would be gained in having the nursery located at a lower altitude where more vigorous plants could be produced in the longer growing season and the trees be dug and placed upon the planting areas as soon as weather conditions made spring field planting possible. The Monument nursery site was chosen and developed in the spring of 1907 as a result of the two years' experience with the other two small sites. The Monument site has proved satisfactory and is now producing the large amount of yellow pine, Douglas fir and Englemann spruce, and the small amount of limber pine that are now being planted yearly upon Pikes Peak.

Following the 1905 field planting, further seedlings of Douglas fir were brought from the Halsey nursery in the spring of 1906 and planted in the Bear Creek region with a little better success as the 1907 counts on this small planting showed thirty-five per cent alive.

In the early operation of this field planting, a study

Up to the close of 1917 some 4,575 acres have been planted on the Pike National Forest, for the most part in the Colorado Springs region and in the vicinity of the famous Auto Highway to the top of Pikes Peak. An additional thousand acres are also being reforested in this vicinity this spring (1918). Fully eighty-five per cent of the area which has been artificially planted to pines and spruces can be considered as successfully stocked with trees. Such losses as have occurred are due principally to the planting of Austrian pine, a species which is here out of its habitat, and to the undertaking of planting work in the fall. While fall planting may succeed in regions where there are early and abundant snows, such conditions cannot be depended upon along the eastern slopes of the Rocky Mountains. The principal species planted are yellow pine on the lower foothills, which in turn gives way to Douglas fir and Englemann spruce on the higher slopes, limber pine being



PLANTED OLD BURNED-OVER GROUND

Showing regular rows of planted trees along Pikes Peak Auto Highway—1912 yellow pine to the right of the road—1911 yellow pine and Douglas fir to left. This country was burned over from 60 to 63 years ago and in that time very little reproduction has come in. Thousands of tourists motor over this road to the top of Pikes Peak annually.

was made and a map completed showing the extent of the types which should be planted with the different species of trees which grew originally upon the areas. The first experiments were made at the lower altitudes with yellow pine and Douglas fir. In the more recent years the production of Englemann spruce and limber pine for the high planting types has been taken up. The low percentage of survival in the earlier plantings showed the need of the most vigorous transplants that could be produced, and this was secured in the 2-1 plant, as leaving the tree two years in the seed bed gave a plant readily handled in transplanting, while the one year in the transplant bed produced a well developed tree with a clustered root system made up of fine rootlets of much greater area than that of the tree crown or evaporating surface.

used for windy, exposed regions. The trees are planted 8x8 feet or about 700 per acre, and the average cost of planting, including the cost of producing the trees at the nursery, is approximately \$11.00 per acre, which is very moderate when we consider the rugged and rocky region in which the reforestation work is being carried on. Generally speaking, it may be said that the annual survival of trees varies from 60 to 90 per cent, depending upon the condition of the soil and the species planted.

When planting was first projected there was little public interest or sympathy for the work. The slow growth of the trees and the slight showing each year had much to do with this lack of enthusiasm on the part of the layman. In fact, in the early plantings complaint was made (though scrupulous care was taken to guard against it) that in planting these watersheds the pres-

ence of camps for the planters would pollute the water of the cities using it for a municipal supply. One prominent citizen spoke with ridicule of the project, claiming it was absurd to spend the people's money for reforestation above an altitude of seven thousand feet because above this altitude the growth was so slow that such plantings could never be of value. Now that the trees show well over the plantations, there is nothing but hearty approval for what has been accomplished. Those

people who are locally interested in seeing the gradual growth of these trees, which have been planted artificially in order to heal the ghastly scars on the slopes of Pikes Peak, to render these worthless areas productive and ensure an abundant supply of water where every drop is worth its weight in gold—I say, those who see these things realize that an excellent work has been accomplished and is being carried forward for the benefit of the public.

THE FEDERAL INCOME TAX AND THE FOREST INDUSTRIES

BY MAJOR DAVID T. MASON

FOREST VALUATION EXPERT OF THE U. S. TREASURY DEPARTMENT

THE Federal Income Tax Law in its present state is a gigantic factor suddenly injected into American business affairs.

It was not until 1913 that an amendment to our Federal Constitution made a Federal income tax lawful. For four years before that time there had been an excise tax on corporations based on income. This tax and the new income tax took only one per cent of the net income of corporations for the years 1909 to 1915. For 1916 the tax rate increased to two per cent. These rates were so low that business was only slightly affected and paid little attention to the tax.

With the coming of the war, however, huge amounts of money were required by the Government for immediate use. The income tax rates for 1917 and later years were greatly increased to secure a large part of this revenue. The year 1913 saw sixty million dollars paid in income taxes; for 1917 the amount had been increased to fifty times as much and three thousand million dollars were collected. From an insignificant factor in its effect upon the affairs of business and individuals the income tax had suddenly become of enormous importance. For one group of lumber companies the income tax now takes approximately fifty per cent of the net income. In many individual cases the tax amounts to considerably more than fifty per cent.

We have emerged from a great war with a national debt so huge that a billion dollars will be required yearly to pay the interest; an additional large amount will be needed to reduce the principal of the debt. The annual expense of the Federal Government before the war amounted to a billion dollars and an increase has taken place since that time. Prohibition has removed one of the important sources of Government revenue. Thus it is clear that the income tax will be an important factor in the business affairs of the United States for many years to come. Business men in all their plans for the future must take the income tax carefully into consideration. It is, of course, the policy of the Government to adjust the income tax so that, as great a burden as it must necessarily be, it will cause the least inconvenience. In order to deal with the whole situation in the most intelligent way the Bureau of Internal Revenue has secured the aid of specialists in framing the original revenue bills and in drawing up the regulations under which the

new revenue laws are being administered. The present income and excess profits tax law presents unusual problems in the case of certain industries such as those engaged in the production of mineral, oil, gas and lumber, which use up natural resources as they operate. The law recognizes as *property* free from tax the value which such resources had on March 1, 1913, the date upon which the Federal Constitution was amended to provide for an income tax; all increases of value after that date are treated as net income to be taxed in the year in which the income is realized. This problem involves the careful determination of the quantity of the natural resources owned on March 1, 1913, and the unit values of such resources at that time.

To deal with this and many other vital but less important problems the Natural Resources Division of the Bureau of Internal Revenue was organized in 1918. At first engineers were appointed to deal only with the affairs of the oil, gas and mining industries. In the spring of 1919, largely at the request of the forest industries, the Timber Section of the Natural Resources Division was organized to handle these problems in their relation to timber. To deal intelligently with the situation, the staff of the Timber Section includes a group of forest engineers individually familiar with the more important forest regions of the country such as California, the Douglas fir region, the Inland Empire, the Rocky Mountains, the Gulf Coast Pine region, the Lake States, the Atlantic Coast Pine region, the Hardwood region, and the Northeast. In order that the regional forest valuation engineer may have the data upon which to act, it is necessary to secure from each individual taxpayer of the forest industries a statement describing in detail his timberland, his plants, and his operations during recent years. For this purpose a questionnaire is now being distributed to the taxpayers. This questionnaire will gather data relating to the kinds and quantities of merchantable timber and young growing timber owned, the prices at which it has been sold in recent years, the average cut per acre in different regions, the losses of timber from fire and other causes, the extent to which forests are protected, the rate of growth of the old and young timber, systems of forest management used, the character of the manufacturing plants, the kinds and quantity of lumber produced each year, and many other important matters.

FORESTRY AND PATIENCE

BY QUINCY R. CRAFT. U. S. FOREST SERVICE. DENVER. COLORADO

"ONE soweth and another reapeth" is perhaps never more true than in the work of the forester. For not only in awaiting results of physical effort, but also in inducing the public to adopt methods which look to the future, patience as well as science is requisite. How often timber holders who undertook to handle their lands under forest working plans prepared in co-operation with the Forest Service abandoned the purpose until it seemed that for the present the practice of forestry on a large scale must be limited to Government and State work!

The first working plan for Government forest lands

after two decades, we find an enduring demonstration of the benefits of conservation worked out in detail in the conditions of employment and daily life of those affected?

The example to which reference is made is the lumbering operations of the Homestake Mining Company, centered at Nemo, South Dakota. A well-equipped logging road connects the sawmill with Company, State and Government-owned timber tracts, on the one hand, and the market, on the other, and all operations contemplate thirty years, if not an indefinite run. Assurance of continued employment promotes efficiency and thrift, and



FINE EXAMPLE OF CONSERVATION

Area cut over by Homestake Company under combined shelterwood and selection system of marking. The timber cut has been completely utilized and a stand of thrifty growing yellow pines is left.

and one of the very first for any large timber tract was prepared in the vicinity of Nemo, in the northeastern Black Hills of South Dakota in 1898, by Henry S. Graves. A picture of a part of this area in which young growth had been preserved and fire protection, facilitated by a good clean-up was used on the first Forest Service calendar. An enlargement hangs in many supervisors' offices, and it has been used more generally for lantern slides and newspaper illustrations of good forestry in America than almost any other.

Is it significant that in this very part of the Black Hills

the type of men and the manner in which the work is conducted indicate that hardship and reckless daring are not necessarily connected with lumbering.

Nemo and the small valley in which it lies are very attractive for a permanent lumber camp; buildings are kept in good repair, and large pines are carefully protected to provide a natural park in the center of the town. The company store is well kept and carries goods of quality and at prices that prove advantageous to Forest officers whose location enable them to buy there. The proverbial isolation of the lumber camp is relieved by



MEADOW OF ALFALFA SURROUNDED BY WOODED HILLS

This affords variety and profit to purse and health of combining farming and timber work. Our forefathers in the East had, along with the hardships of pioneering, the advantages of a plentiful supply of timber close at hand, and the Black Hills farmer is similarly favored.



FORESTRY AND FARMING GO HAND IN HAND

This scene at Nemo shows a fertile alfalfa meadow in the foreground. In the background, slope lightly thinned for scenic beauty along an highway. Good clean-up and disposal of brush and abundant reproduction where sunlight is sufficient.

local entertainments of a literary nature; children are schooled; the men and women look well and happy.

With anticipation of continued use it was practicable to install a model sawmill plant, of larger capacity than is required for present needs, and the men have diversity of work by sawing forenoons and then sweeping up, and sorting, and planing lumber the rest of the day. Logging is done year after year by contract by the local ranchers to splendid advantage as supplemental to their farming. Black Hills conditions, suitable to the natural seeding of a new crop of trees and for the rapid growth of the young trees, also favor the practice of forestry.

The sawmill is owned, and furnishes the timber required by the Homestake Mining Company, of Lead, South Dakota, in which Mrs. Hearst owns a controlling interest, and in which employees have been encouraged to buy shares. The Homestake conducts its operations on a conservative basis, having ore blocked out for mining for many years, and drawing on the richer ore only to an extent that will maintain a dependable rate of dividends indefinitely.

It might be said that such methods will not meet the

requirements of present day competition which drives operators, regardless of personal desire, to handle every operation on the closest margin, and as quickly as possible to release the capital invested to be used in other enterprises; that without the gold mine back of it, such timber operations would lose money.

Yet the Homestake Mining Company is wise and farsighted enough to see that it will need timber for a long time; and that good conditions of employment are better than an ever-changing force and early-aged pensioners from accident and overwork.

There seems to be a minimum of lost motion and waste. Systematically orders are given in advance for the materials needed, and the timber is so sawed. Thus there is very little stock on hand to deteriorate, be endangered by fire, and accumulate interest on cost of manufacture.

When through a more excellent understanding wood consumers generally can be brought into closer touch with producers, distribution improved, and utilization perfected, will not present demands on lumber producers be lessened and the practice of forestry be made easier?

DuBOIS TO ENTER CONSULAR SERVICE

FROM California comes the news that Lieut.-Col. Coert duBois, United States Forester in charge of the California District since 1911 (with the exception of one year spent in France), has received an appointment in the United States Consular Service, and his retirement from the Forest Service has been announced.

As the leader and organizer of the most comprehensive fire-prevention service in existence in the West, and particularly as the principal opponent of the so-called "light burning" theory of forest protection—a theory which has cost California tremendous sums annually through the destruction of timber by fire—duBois has made a remarkable record in this State.

During the war he served as a major with the Tenth Engineers in France, returning just a year ago this month with the rank of lieutenant-colonel, and the task of aiding in organizing new engineer units for overseas duty—a task which was brought to a close by the armistice.

"I am particularly pleased at the marked change during the past two years in the attitude of the people of California toward forest fire prevention," said duBois, in discussing his retirement.

"The main job of the United States Forest Service here has been putting across to the public the knowledge that the future supply of timber so essential to the big agricultural and industrial development of the State—a development which is now well under way—depends first and foremost upon the protection of the young growth in our forests from fire.

"Fire prevention and protection is, and has been, one of California's vital issues. Yet a few years ago this fact was so little realized that forest fires—both those wantonly set and those started by sheer carelessness and indifference—were viewed with amazing unconcern.

"And the one greatest contributing cause to that unconcern was the pernicious, ill-advised and destructive 'light burning' theory—a theory which advocated the deliberate setting of forest fires in the spring and fall with the idea that the undergrowth and down logs might be burned out without damaging mature timber or reproduction, and thus make the forests immune from fires during the summer months. This theory—which is practically abandoned in California today—was based on the erroneous assumption that our forests have persisted *because of* the many fires that have been started in centuries past by lightning, Indians and the early settlers. As a matter of fact, our forests have persisted *in spite of* such fires—and their depleted stand today is the result. Continue to apply the 'theory,' and fifty years hence would see no forest at all in California."

Lieutenant-Colonel duBois entered the Forest Service in April, 1900, as a "Student Assistant" at a salary of \$25.00 per month and found. His first administrative job was earned in 1904, when he was placed in charge of the section of "Boundaries"—a division of the old Bureau of Forestry which determined the location and extent of the various National Forests in the Western states. In 1905 he was made Inspector for the Rocky Mountains and Southwestern Sections, and was appointed Associate District Forester for California when the California District was created in the winter of 1908.

He assumed the leadership of this district in 1911, following the resignation of F. E. Olmsted.

Colonel duBois' appointment in the Consular Service was confirmed by the Senate on September 5 and he has left for Washington. His successor, who will be appointed by Forester H. S. Graves, at Washington, has not yet been announced.

A NATIONAL FOREST POLICY

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE AND A FURTHER OUTLINE IS PUBLISHED HEREWITH. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—EDITOR.

FOREST ECONOMICS

BY H. H. CHAPMAN

EX-CHIEF OF SILVICULTURE, DISTRICT 3, U. S. FOREST SERVICE, AND DIRECTOR
AMERICAN FORESTRY ASSOCIATION

NO well informed student of forestry denies the fundamental principles of economics in determining forest policies. A forester who confines himself to the contemplation of methods of raising trees and ignores the reasons for producing them is about on a par with a foreman whose only knowledge of a business is that of the process of manufacture compared with the business manager whose responsibility it is to make the business a success by supplying demand through the co-ordination of the processes of production, transportation and marketing.

As the Secretary-Manager of the National Lumber Manufacturers' Association, Mr. Compton states the following fourteen points which, shorn of quality verbiage, stand forth as the platform on which his discussion is based:

1. Cheap and plentiful timber and low prices for lumber are not necessarily any benefit to the public.
2. Destruction of the original forests of the United States without provision for forest renewal is not necessarily a national misfortune.
3. The fact that forests are being destroyed faster than they are being replaced by growth does not of itself signify public loss.
4. The virtual disappearance of our best timber trees is not necessarily detrimental to public welfare.
5. It is not even probable that the lands better suited for growing trees than for growing anything else should be so used.
6. The disappearance of forest industries because of exhaustion of timber supplies is neither a local nor a national misfortune.
7. The original timber in the United States should be treated as a mine and not a crop, and no effort made to renew it.
8. The loss of employment for labor caused by vanishing forest industries is not an evil.
9. The idleness of cut-over lands is an evidence that the maintenance of permanent forests upon them is poor public economy.
10. The idleness of cut-over lands is also a proof that it is poor private economy to grow forests on them.
11. There is no obligation whatever resting on the owner of forest lands to use them to grow timber.
12. While admitting that the owner of property should not use it to do damage to other property, we deny that he must so use it as to benefit others.
13. If the public wants more forestry than enlightened self-interest dictates, the public must pay for it.
14. Although the maintenance in idleness of cut-over land is justified, yet we admit that these lands should be protected from fire and in spite of the foregoing thirteen points, we believe that this measure is necessary in order that timber may be grown on such lands.

By comparing the above version of the fourteen points with the original statement by Mr. Compton, it will be seen that the wording has been slightly changed so that the writer lays himself open to the charge of misinterpreting these points. On the contrary, it is in an endeavor to

clarify them and state their exact meaning that the points have been so restated.

From Colonial times the basic, economic conditions surrounding our national forest resources have been such that over 80 per cent of our forests have passed into private ownership. What has been the result of this policy? The fourteen points are an answer. The economic conditions surrounding the lumber industry as it has been conducted in this country are such that the National Lumber Manufacturers' Association voices through Mr. Compton the basic belief of this industry, to the effect that the *production* of timber as a business for private capital has been impossible in the past and will practically remain so in the future. Further, that forest lands now in private ownership must largely, if not wholly, remain unproductive of timber. This platform is justified by a series of economic tenets which, stated baldly, are a most remarkable sub-version of what every other civilized nation in the world considers sound economic policy.

In an effort to justify the stand taken by the business interests engaged in lumbering; namely, that under no conceivable circumstances should the industry be required to take an active interest in the renewal of its raw materials, this economist endeavors to prove that there are practically no public interests which would indicate the necessity for forestry on cut-over lands. Having thus undermined the very foundation of forestry; namely, the need for it as a matter of public economics, it then becomes much simpler to drive home the point that if the public is so foolish as to demand forestry, they must in all reason pay the entire cost of the bill.

What is the matter with these fourteen points?

1. No one has ever claimed that the perpetuation of virgin forests is a wise use of public resources. Growth in the virgin forest is nil. Only by a proper removal of the over-mature timber can the actual increment on any area of forest land be brought into the plus column permanently, but unless the virgin stand is cut in such a manner as to secure natural reproduction, or unless this cut-over area is planted, the growth on the cut-over lands is also nil.

Cheap and abundant supplies of fundamental necessities of life cannot be considered as a public calamity nor is there any possible danger that an abundance of second growth timber will in any way interfere with the production of any other form of public wealth.

2. Classification of land was originally proposed by foresters. It is the interests who own cut-over forest lands who are most active in opposing this fundamental economic need. The use of agricultural land for agriculture is an axiom. The use of

non-agricultural land for agriculture is a public crime. The contention that any forest economist has ever advocated the renewal of all forests regardless of the character of the land is a mischievous mis-statement. Opposition by private interests to the proper classification of worthless agricultural lands as forest lands has been determined and far-reaching.

3. The greatest prosperity is found in the multiplying of industries and not in their elimination. To say that the elimination of forest industries is a public benefit because capital may be profitably employed elsewhere is an argument which could be applied to any other industry and is fundamentally wrong.

4. The statement that the less wood the nation consumes per capita, the better off they are, would be along the same line as the foregoing. We use less wood because we are unable to afford more; just as we cut down on food and clothes for the same reasons. The cheapness, serviceability and usefulness of wood will continue to be desirable and its consumption in large quantities would be a public benefit were it possible to produce wood in adequate amounts.

5. The virtual disappearance of the more valuable timber trees is a public calamity which cannot be overcome by the substitution of inferior species or of metals and other materials. The ability to choose from several substitutes tends to keep down the prices and increase supplies. With wood eliminated, prices must rise and conditions of life become harder.

6. The amount of land which should be devoted to forestry will be determined as much by the need for timber as by the suitability of the land itself. At present land producing 97 per cent of our annual timber cut is being managed so that this production will largely cease in the near future. If it were true that in the future there were any probability that such enormous areas of land would be devoted to producing timber as to seriously reduce returns from agriculture or from any other form of the use of the land, public policy and private interest would dictate the reclassification of some of this land and its devotion to the more needed public utility. Then what should be our policy with regard to this timber land?

7. Where clearing paves the way for a more profitable use of land, that land has been so used except where this development has been prevented by speculation on the part of the original land holders. Where clearing of non-agricultural land has paved the way for forest fires and desolation instead of the continuance of a productive enterprise, the question as to whether public economy is best served is one which cannot be answered off-hand by the statement that the capital required to protect these lands and continue them as forests is better employed in some other undertaking.

8. It is conceded that the lumber business is *not* the business of growing timber. Foresters and economists have realized this from the start. The lumber business therefore treats the forest as a mine, utterly ignoring the fact that it is a crop. Men who buy timber and operate sawmills are not foresters. Yet, through the fact that they are owners of timber land, many of them assume to know more about forestry and forest economics than do the foresters themselves, and because the business of forest production is little understood by them and would involve a line of activity and investment outside of their own business of lumbering, their attitude has been consistently one of pessimism towards those who are attempting to establish the business of forestry on an efficient basis.

If it is true that timber production is distinctly a public enterprise, it must follow that it is a necessary undertaking and that without it the public interests will be seriously injured. Why then is there not a more intelligent advocacy of forestry by those who come the nearest to it; namely, the lumbermen whose business will disappear on the disappearance of the forest resource? The answer is that they have feared that the public will require them to conduct this business and to conduct it at a loss.

9. Local shrinkage of employment for labor, necessitating the transfer of the laborer, his family and his investments, to other fields may result in his securing higher wages, but strikes at the basis of economic stability and independence. Do we prefer hobo labor or laborers who own their own homes and are members of a stable community? Is the increasing scarcity of raw material a benefit because it forces laborers to move from one locality to another or would the maintenance of a supply of raw material be of greater benefit to these laborers?

10. If lands cleared for timber are better suited for agricultural, stock raising, or other purposes, they will eventually be used for these purposes in the absence of the speculative handicap of high prices often imposed upon such lands by private owners who have stripped them of their timber. Since they are unsuited to forestry or better suited to other purposes the loss does not consist in their lack of use for forest production, but in their being withheld from the use to which they are best adapted.

11. The ill-fitness of privately owned cut-over lands fit only for forestry has long been held to be an economic necessity on the

part of the lumber operator for the reason that he cannot persuade himself to risk the use of these lands for the only purpose from which he can ever obtain an adequate revenue; namely, the production of more timber. Idle cut-over forest lands which cannot be forced on the market for agriculture or grazing are a dead load in the owners' hands. Foresight would have enabled these owners to have created values in growing timber with small cost to themselves and these values would carry the land. This point of view these operators have stubbornly refused to admit since they are not in the business of raising timber and since the traditional policy of operators has been to regard the land, after stripping it of timber, as a liability. The measures which might have been taken to preserve small timber and secure reproduction have not been taken. For this reason alone these forest lands are idle and waste and are an economic problem of staggering immensity in most cut-over areas.

12. The average owner of private property in timber lands has so far made but little conscientious effort to determine whether or not it would pay him to try to maintain the forest productivity of these lands. The fact cannot be successfully disputed, that such owners are usually not interested in the possibility of growth, regarding it as so impractical that they could not even waste the time required to consider it. After the cutting is completed, it is useless to take up the proposition since the real opportunity lies in so handling the original cut as to leave favorable conditions for the second cut.

13. The principle that no damage should be done to another's property, while admitted in the fourteenth point, has not been recognized in practice. Forest lands of the United States have been stripped of timber regardless of the effect of this clearing upon erosion, stream flow and irrigation, nor have adequate measures been adopted to prevent this misuse of private property. The further extension of public control to prevent the unnecessary devastation of a source of materials necessary for public welfare will bear discussion. It is not sufficient to say that private owners should be required to undertake no expense whatever to preserve the productiveness of forest land.

14. This point would be well taken if economists agreed that self-interest is always enlightened. It has been the conviction of forest economists for many years that the self-interest of the average operator who is also an owner of forest land has been anything but enlightened, and that the policies which he has pursued, while apparently indicated by economic necessity, have insured the destruction of his business in the least possible time; and where he has been able to secure enough privately owned timber to make his business last for fifty years or more he has found himself staggering under a load and burden of raw material far in excess of the carrying capacity of the business. The lumber business is best conducted when free from this load. The management of forest land should be a business in itself. Enlightened self-interest of forest owners is most apt to be displayed in those who have no connection with the manufacturing end of the business, for when an owner really intends to keep his forest lands permanently, enlightened self-interest will dictate the policy of preservation of the source of income from that land.

15. The author of the fourteen points admits that there is a limit to the policy of "the public be damned." Cut-over land may remain in idleness if private owners do not see fit to have it otherwise, but these same private owners must be required to protect that land from fire or to assist in doing so. The expense thus incurred is not assumed to be for the purpose of benefiting the owner since it has been conclusively shown that these benefits are visionary. Yet fires must be kept out in order that the land may naturally restock itself. Why?

We agree that fire should be kept out in order to assist at natural restocking and that this is the most obvious of the measures which should be undertaken to prevent the complete ruin of 80 per cent of the nation's forest resources. Is this all that should be done? The mere prevention of fire will, under some circumstances, secure restocking of a satisfactory character, but this is not assured unless favored by other factors, familiar to foresters and those who understand the business of forest production.

To accept such a platform would be to make us a laughing stock for the civilized world. The use of lands unfit for other purposes, for the production of supplies of raw materials is so fundamental a proposition and so universally understood in Continental Europe that it is no longer even debated.

When the time comes that owners of forest lands, unfit for other purposes, recognize that it will pay them to devote these lands to their proper economic use as speedily as possible, this problem is going to solve itself. It will

not be solved by a denial of fundamental economic facts or through perversion and distortion in order to justify false economics invoked with intent to avoid this logical conclusion.

CLASSIFICATION OF LANDS AND OUR FOREST POLICY

BY GEORGE DROLET

THERE is no question, but that the oral and written discussion, usually in agreement concerning the vital need of a national forest policy, is bearing fruit in important suggestions and criticisms looking to a forest policy safeguarding the present as well as future generations.

The article appearing in the September issue of *AMERICAN FORESTRY* under the heading "Forest Economics: Some Thoughts On An Old Subject," by Wilson Compton, appears to suggest valuable ideas, and reminds us all of serious obstacles in the path of a real far-reaching and constructive forest policy.

The basic principle dwelt on by Mr. Compton, of land classification, seems to me to be one of the most important problems confronting our almost united efforts to realize a practical solution of the much talked forest policy.

We all know that certain regions are better adapted to forestry than are others. We also must admit that these other regions offer national potential possibilities over a long span of years far greater than would forestry. While the need is urgent for a policy beginning now, yet we must begin on a sound basis by a careful selection of our future forests in order that we may avoid an economic blunder of far-reaching consequences.

BOX MANUFACTURERS RESOLVE

THE National Association of Box Manufacturers at a meeting held in New York City on October 10 adopted the following resolution with respect to a National Forestry Program:

WHEREAS, Wood is a basic material not only for our own but also for other fundamental industries in this country and countless articles made from wood are a daily necessity in the life of the people and

WHEREAS, Our forest capital is being rapidly used up without a provision for future supply in any way adequate to certain future needs, and

WHEREAS, There is a sufficient area of land in the United States better adapted to the growing of timber than of any other crop to produce under proper management an annual yield of forest products in ample supply for the needs of our industries. Be it

Resolved, That the officers of the National Association of Box Manufacturers be authorized and directed to do all in their power through co-operation with the members of this organization and other similar organizations and public agencies to promote the adoption of a National forest program carried out by the State and National Governments which shall include as its cardinal features:

FIRST: A revision of the forest taxation laws so that the owner of land who wishes to hold it for successive timber crops may have such land separately classified with the payment of only a small annual tax upon the land itself and a final payment of stumpage tax at the time of cutting; the establishment of forest nurseries and the preparation of forest working plans by means of which public advice and assistance the land owners may be enabled to secure timber crops of the greatest quantity and value.

SECOND: There should be a very great and vigorous extension of Federal and State co-operation with forest owners in the prevention of forest fires. While it may not be expedient for the public to compel the owner of land to grow timber upon it in case he does not wish to do so the public has the unquestioned right to require the owner to handle his timber cutting operations so that they will not become a public menace. In case the owner of land which upon competent examination has been classified as suitable only for the growing of timber refuses to take advantage of relief from taxation and public assistance in the growing of timber or public requirements as to the safe-guarding of the property of others, such land should be acquired by the public at a fair valuation and made part of the system of public forests.

THIRD: Provision should be made for a large extension of forest planting upon land already held by the State and National Governments for forestry purposes. The growing of timber is a long-time undertaking and no matter how soon nor how extensively large scale planting operations be started, there is grave danger that we cannot sufficiently bridge the gap between existing and future supplies of wood products.

FOURTH: Our present public forests, situated chiefly in the West, contain some 135,000,000 acres, but at least 50,000,000 acres of this total does not carry timber of merchantable value. Ample precedent for the enlargement of these forests by the purchase of cut-over land has been established during the past few years by the purchase of more than 1,000,000 acres of forest land in the Eastern mountain regions. Such public purchase of forest land both East and West should be continued by

the State and National Government until the area of publicly owned timberland is at least twice as great as at present.

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A FOREST POLICY

BY FRANK L. MOORE, PRESIDENT NEWTON FALLS PAPER COMPANY

IN discussing a Forest Policy it should be approached from two viewpoints, each related to the other. The two should be considered as related if we will accomplish practical forestry. This is too large a subject and with too many ramifications to be dealt with briefly except in generalities.

Federal Policy.—I am firmly convinced there should emanate from our Federal Government a practical constructive program of forestry, one that will not only tend to make our forests reproductive, to conserve them, but at the same time utilize them in the best interests of recreation and practical forestry. By practical forestry I mean where the forests are managed as a business proposition. This program should be a guide for the States to follow so far as adapted to the national conditions of each. I am also convinced that the direct management of forest lands by the Federal Government should be confined only to those lands that are owned by the Federal Government.

This Federal program of forestry should be so plain and so imperative as to convey to the various States of the Union the necessity of each State immediately enacting such laws as will accomplish reforestation of State and privately owned lands, utilizing a matured tree crop, making the watersheds of our rivers and streams real watersheds, emphasizing at all times the necessity of having our forests so handled and operated as to improve them for the pleasure seeker and maintain restricted areas for wild game.

State Policy.—First of all is adequate fire protection. The necessity of this needs no argument. A definite survey should be made of our state-owned lands to determine exactly what we have. By this I mean the amount and species of timber, the nature of soil, the amount of burned-over land, cut-over land, land that is fit only for reforestation; in other words, a complete inventory. This information should be obtained from all owning 500 acres or more of timberlands.

Each of our agricultural counties through its Board of Supervisors should employ a forester to make an inventory or survey of the lands that are fit only for growing trees, giving its area, the owner, the nature of the soil, etc.

With this information in hand there should be some definite policy outlined for the management and operation of our state-owned lands that would permit of the cutting of the matured crop under the closest and most strict regulations, so as to maintain the forest in a reproductive condition, and also as a game preserve and enhance its beauty for a recreation park. The waste lands

Only by prompt and energetic measures to accomplish purposes in harmony with these principles can there be foreseen any possibility of alleviating a most serious timber shortage within the next generation.

should be reforested much faster than is being done at the present time.

There should be a definitely outlined policy of educating the people to a point where they should demand of our legislature appropriations to have the State lands reforested. The condition of the matured crop on our State lands should be so put before the people as to show them that this crop could be utilized at an immense profit to the State, and with absolutely safety to the forests, and in many cases improving the forests from the aesthetic point of view.

Privately Owned Lands.—I believe everyone who has invested money in any enterprise so long as it is not a nuisance, should be allowed to enjoy its use and the emoluments to be derived therefrom. The argument has been raised, and perhaps in some cases justly, that in the interests of public health all forest lands should be owned by the State and forever locked up for the benefit of the pleasure-seeker and wild game. On the other hand, is not he who cuts a forest, converts it into lumber, pulp, paper, or whatever use the product can be put to, serving the public?

The problem of suggesting a forest policy for the large timberland owner is much simpler and easier and its application less burdensome than doing the same for the small timberland owner. It is the small timberland owner that must be justly dealt with if we would have continuous forests along our rivers and streams and on our mountain slopes, so necessary to obtain a real forest.

The intermittent planting of today will not produce the deep forest cover necessary for the perpetuation of our forest and the regulation of our rivers. Many owners of timberlands will not reforest today on account of the long time involved for these tree crops to grow.

Reforestation must depend largely upon Governments and Governments will act only in this direction in the response to the pressure of intelligent people.

Having this in mind I am going to repeat here the suggestions which I have made many times, which have not been refuted, as a basis for a constructive forestry policy.

I believe a law could be so drawn as to be constitutional that would permit the State to reforest private lands under the following conditions:

1. An individual or Corporation to make application to the Conservation Department to reforest certain lands.
2. This growing crop to be exempt from taxation.
3. The trees when matured to be cut under State supervision and a stumpage paid to the State.
4. The stumpage to be a lien against the growing crop.

5. The amount of stumpage to be agreed upon by the owners and the Commission in charge. In case of disagreement the two to select a third and his decision to be final.

6. The trees to be considered matured when they have reached a diameter of 10 or 12 inches on the stump.

7. Careful surveys and records of all parcels planted shall be filed with the owners and the Commission.

8. If at any time the owner should wish to discharge the lien he can do so by paying the cost of reforestation plus the interest at a nominal rate and agreeing to practice modern methods in his operations.

If necessary in order to carry out the above the State can be mandatory in reforesting such lands as in its opinion should be reforested.

It involves the initial expenditure by the State with an absolute sure return to the State when these trees are matured and cut.

It makes possible a continuous forest which we know

must be grown in order to obtain the greatest possible results.

It makes possible the utilization of land unfit for anything but the growing of trees.

It protects the head waters of our streams so necessary for a more uniform flow of our rivers.

It makes the operation profitable to the State.

It insures a supply of timber necessary for the use and enjoyment of the people.

It prevents erosion.

It maintains a higher moisture level in our agricultural lands.

In view of our rapidly depleting wood supply, the anxiety that is felt in Canada over the fast depletion of her forests, should spur us on to greater efforts to educate the people of the country to the necessity of a practical forestry program.

What I have said above is in the nature of suggestions from which I hope something practical can be worked out and at once put into operation.

FOREST RESTORATION IN BELGIUM

BELGIUM is restoring its forested lands to a normal condition just as fast as intelligent planting and cultivation makes such restoration possible. There is no lack of labor for the work as the enemy so completely denuded the country of mechanical equipment that resumption of industrial activity is unavoidably delayed.

What is being done in reforestation in Belgium is well described by an English newspaper writer in the *Philadelphia Public Ledger* of October 21. He says:

"The purpose of the visit to Belgium was to inspect the forestry and general reclamation enterprises upon which the government and private land owners were engaged, when the war suspended operations, and which will be resumed at the earliest possible moment with unabated vigor and diligence. The tour was made under the guidance of Henri Vendelmans, who was responsible for many such projects in Belgium in pre-war times.

"In view of the prominent attention that has been given to afforestation in Great Britain and the increasing need for developments, it may be appropriate to give references, first, to work of this description already accomplished and in process of completion in the provinces visited. The program began with a tour of the historic forest of Soignes, near Brussels. Those interested in forestry will be familiar with the distinguishing features of this marvelous expanse of stately beeches, firs, oaks, ash and poplars, and it need only be said that the 10,000 acres of matured and maturing timber and underwood have survived the ordeal of war without serious damage. The enemy did not spare it when their requirements demanded contributions from its wealth of valuable war material.

"Ash was taken without stint for the construction of airplanes, and beechnuts would have been gathered for

the extraction of oil if the staff could have been induced to render such service to the invaders. The comparative immunity of the great forest is due largely to the wisdom and tact of M. Crahay, director of forestry, who, when requested by the Germans to provide them with timber agreed to double the annual normal output if they would consent to the control remaining with him. The advantage of this arrangement was, and is, that while the contribution of 18,000 cubic meters was twice the usual amount, promiscuous cutting was avoided and thus the forest retains its former commanding proportions, to all appearances, unimpaired.

"While the thousands of acres of pure beech constitutes the outstanding feature of the forest and will, in itself, ever be a center of attraction and an education in organized and efficient forestry, there are many other departments equally instructive and suggestive. The system upon which the great crown property is managed is comprehensive enough to allow of wide variety of trees and undergrowth, as well as experimentation in plants, methods of planting and after management.

"In these matters the Arboretum of Groenendael, under the direction of M. Querriere, is exceedingly instructive. The nursery and experimental sections have not fully recovered from the partial suspension caused by the war, but work is again in progress and the various plots are fruitful of useful suggestion and practical demonstration. An indication of the value and activity of the nurseries is furnished by the fact that in the forest of Hertogenwald, east of the Meuse, where great devastation was wrought by the Germans, 250 acres have already been planted with spruce four-year-old plants—from Soignes.

"Several important discoveries stand to the credit of the wartime researches. For instance, the fungoid pest,

which has stopped the planting of white pine, has been remedied effectively by the spraying of seedlings. In the present demand for the speedy recreation of forest nurseries the observation that sowing seed, gathered early, avoids waiting over a year for germination, is a valuable discovery. For this purpose ash seed pulled and sown on August 16 grew best—a full bed—the succeeding spring, but of October seed from the same tree none grew till the following season. Hawthorne berries sown on September 15 gave a good result, but delay was experienced when berries gathered in October were sown. The significance of these points will be appreciated by practical foresters.

"From Soignes, with its vast tracts of matured timber, nurseries and museums, the party moved to the Campine, on the Dutch border, making the old town of Turnhout, famous for its paper and playing card factories, its headquarters. The first day in this expansive sand belt was spent in inspecting young forests of some 1,500 acres belonging to the board of agriculture. The whole of the land was reclaimed from waste and the method adopted in effecting the transformation, and the result as already presented in the healthy and quick-growing alder firs and birches, provide an instructive example of what can be accomplished in converting apparently worthless sandy tracts, slightly undulating, with the scanty herbage of plants of our grouse moors and the home of ducks, curlew, snipe and blackcock, into useful tree-bearing areas. Preliminary cultivation and the growing of yellow lupines for adding humus to the soil, formed important features in the routine, and the conclusion is warranted from what has already been achieved at this and other centers, that the scope for successful afforestation is wide in all countries, and that it would be difficult to set limits to enterprises of the kind in the United Kingdom, if they were planned and carried out on sound lines.

"At the Raevelds, reclamations, planting and preliminary operations have been in abeyance since 1914, and the director, M. Quermet, has been concentrating his attention upon the management of the areas already planted, some of which are carrying trees 10 and 12 years old. These plantations, and those of neighboring owners, provide interesting lessons in enlightened and systematic forestry.

"Trees are planted in considerable variety and the relative results carefully noted. A Japanese larch plantation at Esbeck visited the following day is especially worthy of mention. At fifteen years old it is already of high value. It was planted closely, the trees being only one meter apart, and since then the suppressed trees alone have been removed. At Raevelds the planting of Sitka spruce has been attended with success, when precautions were taken to give it the shelter it requires in early life. Many species are being tested, and when the young woods afford sufficient humus other species, such as poplar, will be introduced. The woods are mostly Scotch pine, but, besides these, exotics are planted freely. There is no falling off in vigor as time goes on, as is instanced by a forty-year old pine plantation at Rethy, carrying 108 loads of pit wood per acre. The demand for firewood is so extensive that all expenses of early thinning are re-

couped from this market, and it was pointed out that when it is desired to reclaim for agriculture land from which wood has been felled the fuel value of the stumps covered the cost of removing them.

"The essential conditions of success appear to be preliminary cultivation, manuring with lupines and chemical manures, lining and surface draining. No farm crop could be more responsive to suitable treatment of this description than the young plantations occupying the former wastes of Campine have been. The work entails considerable initial expenditure, but by thick and mixed planting and the inclusion of undergrowth, such as alder, the period during which the areas are unproductive is curtailed and the financial problem appreciably simplified for the state or private owner.

"Other reclamation and afforestation enterprises in the same province visited were those of Baron van Haver, under the management of M. J. de Wilde, of the Utrecht Insurance Company, at Esbeck, where M. C. Sissingh is director and of the King of the Belgians, near Rethy, under the supervision of M. R. van Elst. At all these centers forestry constitutes only part of the general scheme of reclamation and it is less prominent relatively at Esbeck and on Baron van Haver's estate than at Raevelds and on the royal property. At both places, however, the value of trees is appreciated as a direct source of wealth and a part of composite improvement, and the work is conducted on lines similar to those that have answered so successfully elsewhere.

"The king's estate of 10,000 acres is a noteworthy example of intelligent and balanced reclamation. The work was begun fifty years ago when the land was bought from the different communes for Leopold I, at whose death the property passed to the Count of Flanders and in due course to the present king, and steady progress, interrupted only during the war, has been made in developing the property to the benefit of the district and the country. Already operations have been resumed upon the land that reverted to its former wild state in the past few years."

THE DOUGLAS FIR

By Donald A. Fraser

Proud monarch of the West's green-fringed hills!

Majestic pillar of the sunset sky!

In grim, dark gauder thou dost raise on high
Thy tap'ring head to where the glory fills
The firmament. The roseate radiance thrills

My soul not more than that weird melody

The ocean breeze awakes mysteriously

Among thy boughs whenever it so wills.

Long centuries have scored thy rugged side

With gashes rude and deep; thy wounded heart
Hath shed great tears, and these, congealing,
hide,

Or strive to hide, the gaping rents in part;

And centuries more thou still might'st stand
in pride,

But envious man now claims thee for his mart.

EXTENSION WORK IN FORESTRY

BY A. F. HAWES, EXTENSION SPECIALIST IN FORESTRY

THE readers of AMERICAN FORESTRY are thoroughly conversant with the progress that has been made during the past twenty years in the administration of the national forests, and of state forests in a few states. It is a lamentable fact, however, that the private forests, comprising about four-fifths of the forest area of the country, have as yet been little affected by the application of forestry principles except in the matter of fire prevention. The remoteness of much of this forest area and the existing market conditions make the introduction of intensive measures impracticable at present. But these objections can hardly be raised in regard to the farm woodlands, which comprise about two-fifths of the total forest area. They are comparatively accessible to the markets and are less exposed to damage by fire than other forest property. Moreover, they can be handled more advantageously in connection with other farm operations and in such a way as materially to help the farm-labor problem and increase the farm-labor income. The handling of the farm woodlands, most of which are of small area, does not call for involved working plans, but rather for the application of common sense based on a knowledge of forestry principles. In many cases co-operation on the part of woodland owners in the handling of their products will doubtless seem desirable in order to obtain the best results. Leadership is necessary in order to bring about better management of the farm woodlands just as it has been necessary in producing better farm management. This leadership can be provided very largely through the county agents and the other extension forces which are being developed under the Smith-Lever law. The extent to which this extension work is now being carried on and its possibilities for improved agriculture, including forestry, are hardly realized by the majority of people.

During the fiscal year 1917-1918 there were regular funds available for extension work amounting to \$7,625,000, of which about two-fifths came from the federal government; one-fourth from the various states; one-fifth from county appropriations, and the remainder from the colleges and miscellaneous sources. In addition to these regular funds, Congress made available for that year through the food production act \$1,348,400 for similar purposes.

All of the agricultural extension work is administered through the States Relations Service, which is a bureau of the Department of Agriculture, just as the Forest Service, Office of Farm Management, etc, are bureaus of the department. The work of the States Relations Service is handled

in two offices: the office of the south having to do with the states of the cotton belt; and the office of the north and west dealing with 33 northern and western states. Of the funds described above, \$1,040,000 was appropriated by Congress to the States Relations Service and was available for administrative and demonstration purposes at the discretion of the service. The funds appropriated under the so-called Smith-Lever Act, amounting in 1917-18 to \$2,080,000, were divided by law among the various states in proportion to their agricultural population. Thus Pennsylvania received \$108,383.33, while Connecticut received \$13,725.86. These allotments to the various states are contingent upon the state appropriating an equal amount minus \$10,000. Thus Pennsylvania appropriated \$98,383.33 to receive its federal allotment and Connecticut \$3,725.86. This Smith-Lever appropriation is increased annually by \$500,000 up to 1922-23.

These monies, both state and federal, are administered by the various agricultural colleges through their



FIRE-SCARRED KENTUCKY BLACK OAK

Farm woodland of black oak which has been injured by fires and insects. It should be reproduced to more valuable species and protected.

extension services. There is usually a director of extension in charge of this work corresponding to the dean in charge of the teaching on the campus and the director of the experiment station in charge of investi-

sion service a growing body of specialists responsible for extending the knowledge of the various branches of agriculture throughout the state and corresponding to the professors who teach in the institution. Thus we

have specialists on animal industry, dairying, horticulture, agronomy, entomology, rural engineering, and in a few cases in forestry, according to the needs of the state as judged by the extension director.

The question naturally arises as to whether the extension directors are awake to the importance of farm forestry as a branch of agriculture and whether the time is not ripe for the expenditure of part of this money for extension in forestry as its importance would seem to indicate. Statistics recently compiled by the Bureau of Crop Estimates show that for the year 1918 cordwood was the sixth most important crop of our farms, being exceeded in value only by corn, wheat, oats,

hay and cotton. The total farm value of this crop was \$487,106,000. While it is true that there is no relation between the amount grown in a year and the amount cut



A SPLENDID STAND OF SPRUCE

This land was formerly pastured and timber raising is therefore more profitable here than grazing.

gational work. The money is largely distributed among various extension projects according to his knowledge of the needs of the states, but under the supervision of the States Relations Service at Washington.

A few fundamental lines of extension work have been developed which rightly utilize most of the money. Of these the employment of county agents is most important. About half of all the money available is utilized in maintaining this force of agricultural experts who are in a position to bring any methods of improved agriculture, including forestry, directly to the attention of the farmers. The work for farm women very appropriately comes next, utilizing 15 per cent of the funds. Under this project a great many counties have home-demonstration agents. Boys' and girls' club work holds a well-deserved position next to the women's work, having 7 per cent of the funds.

In addition to these three fundamental agencies by which all lines of agriculture may be brought directly to the men, women, and children, there is in each exten-



AN UNFORTUNATE MIXTURE

Here valuable white pine is being injured by inferior gray birch. The latter should be removed to help the pine.

it is also worthy of note that there are other valuable products of the farm woodlands such as posts, ties, poles, lumber, etc.

In the eastern United States there was a woodland area on farms in 1910 of 143,391,568 acres,* a decrease of about 15 per cent since 1880. The ten states having the largest areas, each with over six million acres of woodlands on farms are Georgia, North Carolina, Alabama, Missouri, Virginia, Tennessee, Arkansas, Mississippi, South Carolina and Kentucky. These southern states are, of course, prominent in this grouping largely because of their size. The ten states in which the largest proportion of the farm land is wooded, in each case over 40 per cent, are as follows: North Carolina, Florida, Georgia, Arkansas, South Carolina, Alabama, Maine, New Hampshire, Virginia, and Rhode Island. If the states are grouped in relation to the value of the cordwood produced on the farms in 1918, the ten leading states, each producing over 18 million dollars worth of wood, are: Michigan, Texas, New York, Georgia, North Carolina, Wisconsin, Virginia, Arkansas, Mississippi, and California. Grouping them in relation of the woodland income to the total farm income the ten states in which the woodland income exceeds 8 per cent of the farm income are as follows: New Hampshire, Maine, Vermont, Florida, West Virginia, Massachusetts, Connecticut, North Carolina, Rhode Island, and Virginia. It will be noted that North Carolina and Virginia appear in each of these four groups and may, therefore, be considered the most important farm woodland states.

The extent to which a state can help the woodland owners through the Smith-Lever law depends partly upon

* Bulletin 481, "Status and Value of Farm Woodlots in eastern United States," by E. H. Frothingham

the size of the agricultural population of the state and partly upon the importance of the woodland problems as compared with the other problems of the farms. The ten states receiving the largest allotments under the Smith-Lever law, in each case over \$100,000, for the year 1919-20 are: Pennsylvania, Texas, Illinois, Ohio, Georgia, New York, Missouri, North Carolina, Alabama and Tennessee. It is, of course, apparent that in some states, as in those of New England, where the woodland problems are relatively important, comparatively small funds are available from this appropriation either because of the small population, as in Vermont, or the relatively large urban population, as in Massachusetts. The New England States were, however, the first to realize the importance of the woodlands and they have accordingly built up strong forestry departments. In fact, the state foresters were carrying on extension work before the agricultural extension work in New England existed. It will, therefore, be the best policy in these states for the extension services to assist the state foresters in so far as their limited funds permit. In states where there is no strong forestry department, or where the state forester is wholly occupied with fire prevention or the administration of state forests, a specialist in forestry should be employed by the extension service, and an organized effort should be made to bring improved woodland management directly to the attention of the farmers.

In order to direct the work in farm forestry extension, the Forest Service will need financial support from Congress similar to the support which other bureaus receive for their extension work.

OUR OFFICES BURNED OUT

On October 6th, a fire in the Maryland Building, Washington, D. C., burned out the offices of the American Forestry Association. The employees all escaped safely but the fire destroyed large numbers of magazines, a quantity of stationery, and a number of records. Luckily membership records were preserved, and aside from a two weeks' delay in issuing the November magazine the members are not inconvenienced.

Ample insurance policies covered the actual losses in stationery, furniture, typewriters, etc., and two weeks after the fire the Equitable Fire and Marine Insurance Company, of Providence, Rhode Island, made a satisfactory settlement.

The lost magazines, however, cannot be replaced by insurance and the members are requested to kindly assist in restoring the magazine files of the Association by contributing back copies if possible. The following issues are particularly desired:

1919—January, February, March, April, May and July.

1918—March, April, June, July, August, October and December.

1917—January, February, March, April, May, June, August, October, November and December.

1916—January, March, October and December.

1915—January, February, March, April, May, June, July, August and September.

All months of all previous years.

Please mail magazines to American Forestry Association, Maryland Building, Washington, D. C.



CUTTING LARGE TIMBER

This is a typical logging operation in a heavy stand of hemlock in the British Columbia coast region.

TIMBER CRUISING

BY P. L. LYFORD

MOST lumbermen, or persons interested in timber, understand that a "timber cruiser" is one who estimates the quantity and quality of logs or lumber contained in standing trees. He is also expected to advise as to topography, logging conditions, and anything else his employer may require to know, which has a bearing on the ability of the tract under consideration to produce logs profitably.

No doubt the earliest logger was somewhat of a timber cruiser, but he would not have known himself by that name. It was at a much later day, when the timber "looker" went out on long trips with a map for a chart and a compass as the most indispensable part of his equipment for roaming the trackless forest that someone likened him to a mariner who, similarly, finds his way on the pathless sea, that the term "cruiser" was applied to him. It was an apt comparison, and the term "stuck."

The quantity of standing timber is usually expressed in board feet, according to the log rule used in the locality concerned. There are some exceptions to this, notably the pulpwood regions of the Eastern United States and Canada, where the cord is largely used as a unit of measurement. The cord is also used on the Pacific Coast for measuring Cedar Bolts for shingles. Theoretically the log rule gives the number of board feet that the logs will produce in the form of sawn lumber. In practice, this is rarely the case, because of imperfections in log rules, errors in allowance for defects, or curved, crooked, or broken logs. However, the cruiser must report in board feet, and it is obvious that his results will always be somewhat less than exact.

In the early days (and even now, to some extent), the

timber cruiser frequently estimated comparatively small areas by eye, simply wandering through the tract more or less systematically, and making up his mind by comparison with similar tracts with which he was already familiar that this one would run so many thousand feet

to the acre, and multiplying this by the number of acres in the tract to get the total stand of timber. Usually, however, in recent years, practically all cruisers make an estimate of the individual trees on a certain proportion of the area, to furnish averages for applying to the whole area.

The detail of procedure for most cruisers in determining the scale of a tree is somewhat as follows: Estimate the thickness of the bark, and determine the diameter of the butt of the first log *inside* the bark. (This is not so easy to do on the Pacific Coast where the bark varies from one-half inch on small spruce trees to as much as a foot in some cases on large Douglas fir trees.) Calipers or diameter tape may be used to measure diameter *outside* the bark. Next, the taper of the tree is estimated so that the diameter inside the bark at the end of the first log may be determined. (To get the number of board feet in a log, it is necessary to know the length of the log and the diameter inside the bark at the small end.) This is repeated for each log until the top of the merchantable length is

reached. A few inches extra must be allowed for the length of each log in order to provide for full even lengths of lumber when the log is sawed. Now the measurement for each log having been determined, it remains only to read the scale in feet for each log from the log rule table and add the logs together to get the



PACIFIC COAST BALSAM FIR ON THE LEFT AND YELLOW CEDAR OR CYPRESS ON THE RIGHT

scale of logs in the whole tree. The tree has, in the meantime, been scanned for signs of defect, or outward indications calling for a reduction in the scale. When such a suitable deduction has been made, the final result should be close to the actual lumber content of the tree. This, however, is a slow process, and not many cruisers take time to do the work so thoroughly. After the eye has become trained to sizes and lengths, a somewhat prolonged glance at a tree enables the cruiser to make up his mind as to the scale of the logs, and the amount for the tree is put down in round numbers. Many cruisers also note the percentage of grades, either of logs or lumber.

Trees are tallied in this way, over certain areas, either in the form of strips or sample plots. The trees are tallied on a *strip* by following a straight compass line, and including all the trees for 33 feet (one-half chain) on both sides of the line, so that a one-chain wide sample of the stand is obtained, and when this has been done for a distance of ten chains, the trees on *one acre* have been tallied as to board feet contents. The average stand for a number of acres is obtained in this way, and when a certain proportion of a "forty" or a quarter-section, or a square-mile section has been covered, the average is applied to the whole area. When the sample plot method is adopted, the sample plots are generally taken in one-half acre circles, and located at regular intervals on the cruise lines. The strip method is more satisfactory, however, and is much more widely used.

The results of the work of the timber cruiser range from simple columns of figures giving the kinds and quantities of timber, to a fairly elaborate map with elevations marked, and cruise figures recorded directly on the map, accompanied by a written report. Methods of field work and form of presenting results vary widely according to the personal experience, character, and ability of the individual cruiser.

The demands of timber owners, lumbermen and log-

gers have led many cruisers into the habit of working on rather a wide margin. Often a man who has timber to sell, is, of course, eager to see as high a cruise as possible on his timber land. On the other hand, a lumberman who wants a report on timber which he intends to buy and operate, demands a considerable margin of safety and consequently thinks most highly of the cruiser who turns in a figure well below what he will cut off the tract when

he operates. This has resulted in an uncertainty among timbermen and investors as to the validity of cruise reports in general, because of extreme variations in reports on the same tract, due to variability in standards and methods.

What the cruising profession has lacked is engineering training, with its resulting standardization of methods. The forest engineer, who is the modern timber cruiser, has brought his technical training to bear on the problem, and expanded the "timber cruise" into a "forest survey." The chief points of difference between the two are that the forest survey includes topographic (contour) maps, based on a series of systematically located compass lines, and a more extensive use of *measurements* as a basis for determining volume in board feet.

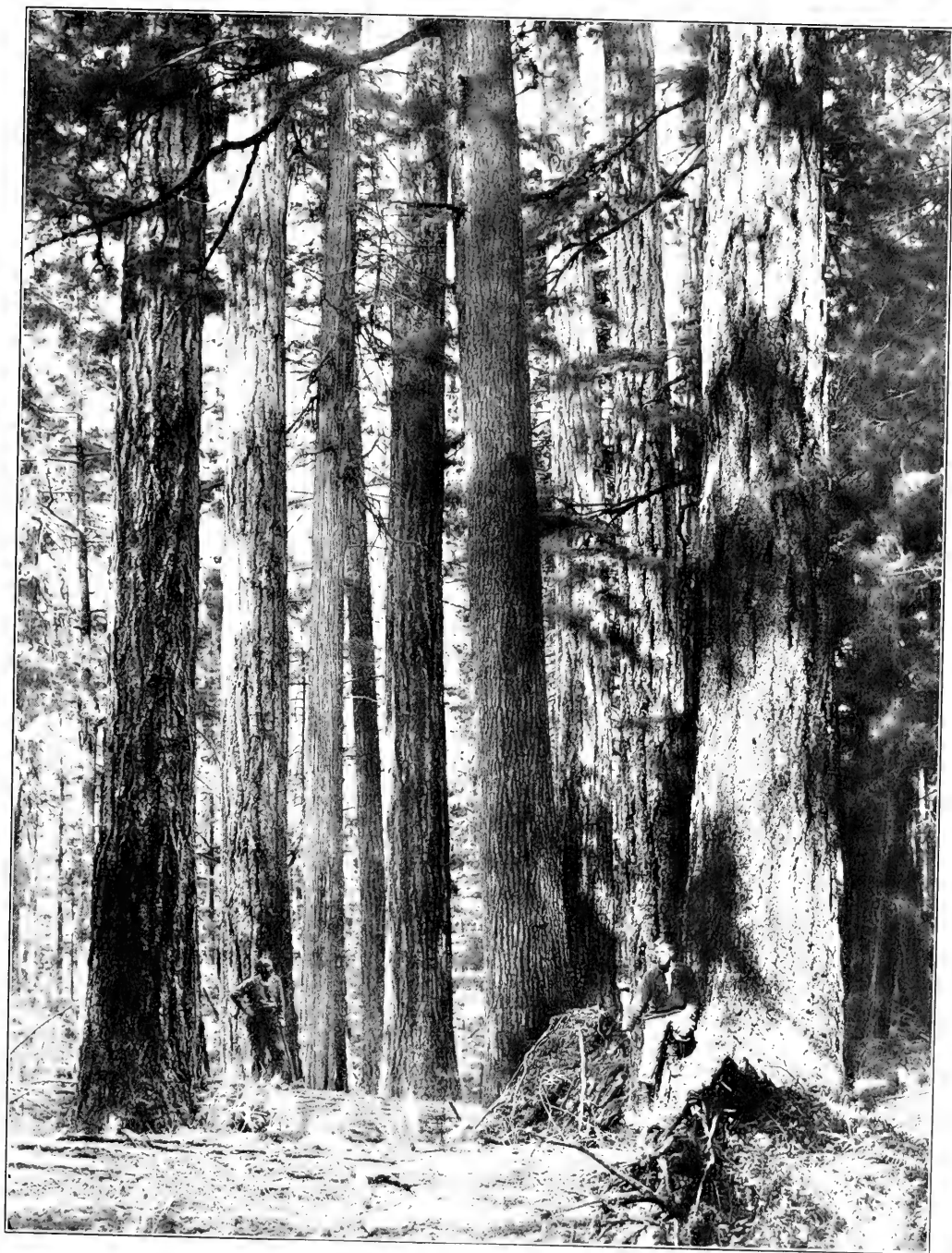
The *first* necessitates the establishment of base lines, carefully chained and leveled, and marked at five or ten-chain intervals for cruise lines. (See sketch plan.) The cruise lines are run from one base line to the other at whatever intervals have been decided on, usually ten chains apart. For smaller areas and

patchy timber, a closer spacing is obviously desirable. Likewise for large areas with extensive uniform timber types, wider spacing may be used. Complete record is taken of all stream crossings, rock outcrops, elevations, etc., and the timber is tallied for 33 feet (one-half chain) on each side of the line.

If the spacing of cruise lines is 10 chains apart, the parallel cruise lines (on which a complete tally of timber and other data are taken) will, of course, occupy 10 per



"CYPRESS" OR YELLOW CEDAR ON LEFT AND PACIFIC COAST
BALSAM FIR ON THE RIGHT



TIMBER IN THE BRITISH COLUMBIA COAST REGION

The trees from left to right are two five-foot Douglas firs, a three-foot cedar, a five-foot fir, a three-foot hemlock, a six-foot spruce and two five-foot firs.



WESTERN RED CEDAR

cent of the tract. Where the spacing is 5 chains, 20 per cent of the tract is covered. For any but very small areas, a 20 per cent cruise is sufficiently accurate even for high priced stumpage.

The second brings in the use of "Volume Tables." A volume table for any kind of timber, Douglas fir, for example, is a table that gives the average scale for Douglas fir trees according to diameter breast-high (*i. e.* 4½ feet above ground) outside the bark, and merchantable length. Thus, from a volume table prepared by the United States Forest Service, one can read that a fir 36 inches in diameter, and having a log length of 170 feet, contains on the average, 2,020 feet if scaled with the Scribner Rule. The volume table is made up from a large number of measurements of trees of all sizes, taking the diameter breast-high outside the bark (which can always be actually measured, and, therefore, does not need to be estimated) and the scale of the whole tree by logs according to the log rule. Of course, these measurements are taken from felled trees, and the scale of the trees 36 inches in diameter breast-high, for instance, is averaged, so that one volume figure is obtained that will apply to all trees of that species 36 inches in diameter and within a certain range of merchantable height.

In using a volume table it will be borne in mind that its figures are average figures, and that local measurements must always be taken on each tract so as to determine whether the timber on the particular area cruised will scale better or poorer than the average shown by the table, and how much better or poorer.

From 80 to 95 per cent of all sound trees of any species within any type of stand fall within a normal range of variation as to form of bole, and the relationship between base diameter and average volume can readily be determined by taper measurements on a comparatively small number of trees within each type in conjunction with volume tables based on taper measurements of large numbers of trees. The base diameters of these sound

normal trees are tallied as *measurements*, giving an *impersonal* volume control of the sound timber. Allowances for abnormal form and visible defect are tallied by trees as *opinions*. Allowances for unseen defect, breakage in falling, and other shortages, are made by types, or other subdivisions, rather than by trees.

The form in which the results of a cruise, or forest survey are presented, is an important consideration. A topographic map, with contours, and timber types distinctly outlined is most essential. This furnishes a bird's-eye-view of all conditions of interest to an owner, operator or prospective purchaser. The cruise figures may be put directly on the map, or tabulated separately by units of area. A separate cruise sheet or sheets furnish a compact summary of kinds, quantities, and sizes of timber. A written report covers all points not graphically shown

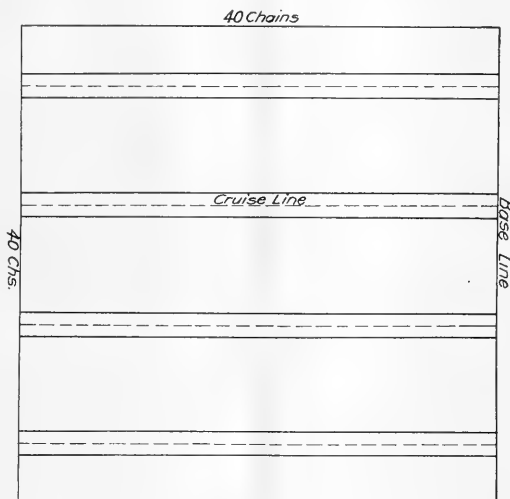
on the maps and cruise sheets, including a discussion of logging conditions, markets, etc. The whole is calculated to give the following results:

1. A reliable basis for valuation.
2. A basis for an effective plan of operation.
3. The best possible location of roads, camps and other improvements.
4. A reduction in loss from windfalls and normal decay. The felling areas can be adjusted with reference to the need of promptly cutting damaged or over-mature timber.
5. The preservation of knowledge relating to the property. Without a survey system, much information may depart with those who happen to possess it.

6. Reduction in loss incident to change of management in an operating company. An adequate forest survey provides a new manager with a mass of essential knowledge ready for his use.

7. Efficiency of fire protection system.

The cost is not the least important point in connection with forest surveys and cruising, though it has been left until the last. The charge for a complete showing as outlined above, rarely exceeds two cents per thousand feet, and usually is nearer one cent.



PLAN SHOWING ARRANGEMENT OF CRUISE LINES ON QUARTER SECTION (160 ACRES)

The dash lines represent the cruiser's line of travel. The light solid lines on either side of the dash lines are boundaries of the strip within which all trees are tallied. The topographic features between cruise lines are mapped as far as can be seen on the line of travel, thus filling in from line to line.

A CHRISTMAS SUGGESTION

Are you puzzled about the selection of Christmas gifts?

Why not give a year's subscribing membership in the American Forestry Association as a gift. It will cost you \$3.00, and the member will receive American Forestry Magazine for a year.

This will be an ideal Christmas gift for a child or an adult.

Send the money to the Association and a Christmas Card will be sent you to present on Christmas Day.

SYRACUSE COLLEGE OF FORESTRY EXHIBIT

IN the neighborhood of thirty thousand persons studied the exhibit made at nearly a score of county and state fairs and expositions in New York state the past fall by the New York State College of Forestry at Syracuse. This did not include those who passed the exhibit merely glancing at the showing made, but only those who really made a visit to the exhibits.

The College of Forestry, as soon as the war was over,

commission in Hungary and Serbia, was secured by Dean Hugh P. Baker to organize its exhibit work. Lieutenant Cless is known to foresters and lumbermen from his work in the Chicago exhibit of the National Lumber Manufacturers' Association, in the permanent building materials shown in that city.

The first plan of the exhibit was to departmentalize the various panels and exhibits so that each might bring out a particular phase of forest work. The manner in which the College of Forestry trains students was shown by pictures of student activities in the College at Syracuse and at the summer camp at Cranberry Lake.

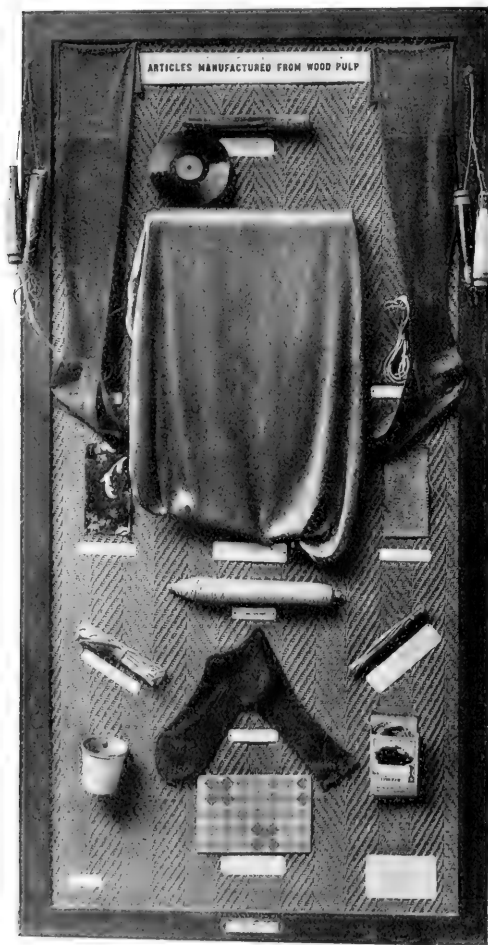
Another phase of the exhibit was to show the need of forestry, to conserve water resources, prevent erosion, and provide water reservoirs for drinking and industrial uses. Still another was a demonstration of how the College works to aid the state by sending representatives out to assist in reforestation projects, lectures to farmers on the woodlands, and how, by its publications and other lectures, the College is taking forestry to the public of a great state.

Special attention was paid to utilization of the waste of the forest, and this was shown in many ways. One panel, for instance, was "The Story of the Pipe," another, a panel showing the manner in which small bits of wood are used to form the minute parts of a piano player. Another display was a set of wooden dishes made from what a few years ago would have been sent to the mill burner as waste. These displays were made with the co-operation of manufacturers and other agencies, and for the State Fair at Syracuse the Bureau of Standards of the Federal Government loaned an extensive exhibit showing the utilization of wood for twine, substitute fabrics for burlap and the like.

Probably, however, the most studied exhibit was that of the use of wood for artificial silk manufacture. It caused such wide attention that the newspapers took up the discussion of artificial silk, and, by error, credited the display to the laboratory of the College of Forestry at Syracuse, when in fact it was made up by co-operation of various manufacturers.

Such unique uses of wood as silk stockings, the manufacture of linoleum, phonograph records and sausage casings, brought special attention at all the fairs. The exhibit attracted such wide attention that it was finally necessary for the College of Forestry at Syracuse to send out a special statement on the manufacture of artificial silk in the United States with which to answer inquiries as to the manner in which wood waste could be used for this industry.

How the College of Forestry has been campaigning, together with such organizations as the American Forestry Association, for beautification of highways and for the proper forestry development of public grounds, such as schools and hospitals, was shown in another series of panels.



UNIQUE MANUFACTURES FROM WOOD

This panel was a feature of the exhibit, showing as it did the many and versatile uses of wood in the manufacture of articles in constant daily use by every one—articles in appearance far removed from their origin in the forest.

began its plans for the autumn educational work, and a returned soldier, Lieut. George H. Cless, Jr., who served in Italy, and who later was head of a food investigation

SENTINELS OF THE FOREST

CONTRIBUTED BY THE AMERICAN RED CROSS

THE branches of the trees bordering the Route Nationale interlaced overhead forming a long vista of restful green. Beyond, on the brown hills and the green, scattered among the fields of yellow mustard and waving grain, the fruit trees hung low in profusion



THIS WAS FRANCE IN PEACE

of pink and white blossom. Under foot the daisies riot-ed and forget-me-nots and clover brushed each other. The cattle browsed on the hills and the little stone houses stood neat among their kitchen gardens. It was France at peace. A sharp turn in the road and the scene changed. Gaunt, broken, burnt stalks of trees stood ghastly sentinel along the Route, stumps of fruit trees dotted the fields, seared and shell-torn, across the road an old peasant woman, bent with age gathered fagots to warm the cellar where she lived, beneath the wreck of her home. It was France at war. German devastation had sacrificed sixty-two per cent of her fire-wood and ten per cent of her lumber, to say nothing of her orchards.

Notwithstanding the heavy demands that came to it from every side, the American Red Cross, realizing the supreme value of "just trees" donated \$10,000 in support of the scheme of the Touring Club of France for replanting the woodlands and orchards of northern France. Early in 1919, ten thousand live trees were shipped from America to the devastated regions.

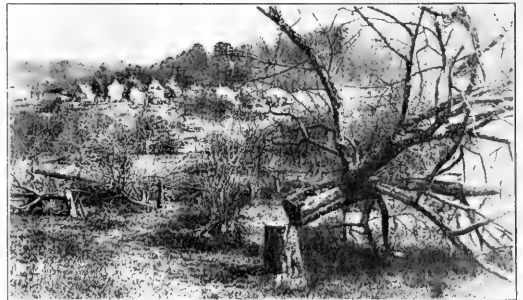
In America, the Red Cross is not concerning itself with the conservation of trees. It is satisfied that the

government has a well-organized scheme already working, backed up by such large, national organizations as the American Forestry Association, and strong forestry departments in the various States; but it has its eye on the man who looks after the trees, the forest fire guard. That sturdy pioneer, who puts himself beyond what is called civilization to stand sentinel for civilization, the man whose lonely vigil stands between a city and a flood of flame—is anything too much to do for a watcher who warns of such a disaster as the forest fires which swept the Superior Lake district last year?—and fights it, often at the risk of life. The Red Cross spent thousands of dollars to succor the victims of that catastrophe and it will work with the men who prevent disasters that we never hear about. It will continue relief in the out-of-the-way places that it has discovered in the course of its Home Service work with the families of the military men. It has taken comfort, cheer, health and even life to the tiny cottages in deep canons, and to the beacon towers on the mountain tops. It has established itself in districts, ninety per cent of which are not covered by any other relief organization. It likes these big,

free places and it likes the people, and wants to grow up with them, as their families grow, and become a composite part of the home. To continue its work for humanity, the Red Cross must have the united support of the American people. With this end in view, it is holding the third annual Christmas Roll Call. It is hoped and expected that last year's wonderful record of those who affixed their signatures to the Red Cross roster will be broken.



AND THIS IS FRANCE IN WAR



SYSTEMATIC DESTRUCTION BY GERMANY OF THE FRUIT ORCHARDS OF FRANCE

WHAT NEWSPAPERS SAY AS TO A NATIONAL

WITH October 27, the anniversary of the birth of Theodore Roosevelt, new impetus was given a national forest policy for the editors of the country have been quick to respond to the suggestion of the American Forestry Association that the greatest memorial that the nation can erect to the late president would be a national forest policy. The *Atlanta Journal*, in a leading editorial, says "the importance of a national forest policy was illuminated in an address by Charles Lathrop Pack, president of the American Forestry Association. His speech has attracted wide attention and it is to be hoped this sound advice will receive from Congress the attention it deserves. We believe the increasing interest in this question will make it the easier to impress upon Congress the importance of the enactment of desirable legislation." The *Philadelphia Inquirer* is among the first to take up the suggestion of honoring Col. Roosevelt with legislation looking to perpetuate our forests. To quote the *Inquirer*:

"The birthday anniversary of Theodore Roosevelt will be the occasion of many ceremonies in memory of this virile and robust American, but a suggestion has been made by Charles Lathrop Pack, president of the American Forestry Association, which is peculiarly appropriate. He says that if the people of the United States want to erect a real monument, a lasting memorial for all time, in honor of Theodore Roosevelt, they can do it on his birthday by starting to work for a national forest policy. He calls upon all who are in a position to do so to plant a tree in honor of this great American.

"It goes without saying that the other memorials which have been planned will be carried to completion. The success of the movement for the purpose is already assured, but it would be peculiarly appropriate if his name could be made the rallying cry for the preservation and the perpetuation of the forests."

The *Times*, of Trenton, N. J., is another paper to take up quickly the message which it does in these words: "It is a timely and important plea which Mr. Pack, of the American Forestry Association, makes to the people of this country in connection with the movement to honor the memory of Theodore Roosevelt. Mr. Roosevelt was a lover of all that pertained

to the great out-doors and trees surely have a large part in the kingdom of nature. This being true there can be no more suitable tribute paid to the former President's memory than the planting of trees and the preservation of forests. Forests are among the greatest national resources. Forests are like banks, as Mr. Pack tells the foresters, lumbermen and wood users generally, you must deposit in them if you want to take anything out. Then, in addition to the material benefits to be derived from the restoration and conservation of forests, the planting of memorial

lic sentiment must be aroused in favor of a more adequate and definite policy by the government in regard to forests." The *Geneva*, N. Y. *Times* impresses the point that "the American Forestry Association heartily supports the demand of the United States Forest Service for a national forest policy," and then points out the need for arousing public sentiment to that end. "Peculiarly fitting would be such a testimonial" says the *Boise Statesman* in an editorial on a memorial for Col. Roosevelt and it adds "in addition is the inculcation of the idea

which should be kept alive in America, the need of reforestation." The *News Press*, of St. Joseph, Mo., calls attention to the fact that "we have prided ourselves on being a business-like nation. Such extravagance as we have shown and continually show with our resources makes us seem to lack the first rudiments of far-visioned business sense." Comparison between this country and the countries of Europe is taken up by *The Republican*, of Findlay, Ohio, which says "the same sort of a situation as faces this country faced the nations of Europe. They recognized it in time and now, governed by stringent forestry laws, have solved the problem." In an editorial reviewing the situation in Missouri *The Globe-Democrat*, of St. Louis, says "we face a serious forest problem resulting from the waste of ax and fire. We need in this country a greater realization of the value of our forests, of the need of their preservation."

The *Commercial-Appeal*, of Memphis enlists in the cause of a forest policy and points out "that it is difficult to get away from the old idea that forests are objects to be exploited. We should stop the reckless clearing off of new grounds and reclaim the waste lands that already afflict the state." In the view of the *Boston American* "we can only preserve our forests by taking public possession of them and applying the principles of forestation that the Germans have worked out." The *Sun*, of Springfield, Ohio, says "the only possible remedy is preservation of great American forests. The American Forestry Association, realizing the acuteness of the situation, asks co-operation from lumbermen so as to bring forcibly to the attention of state legislatures and the national congress the dire necessity for legislation

THE BEAUTIFUL PICNIC PLACE



AS THEY FOUND IT.



AS THEY LEFT IT.

(Reprinted by special permission of the Chicago Tribune.)

trees is one of the greatest forces for Americanization and keeping aflame the community spirit, born of the war, according to the Association's officers at Washington, who are registering all memorial trees in a national honor roll."

Importance of a national forest policy is viewed by the editor of the *Christian Science Monitor* this way: "What is to be done? Obviously the nation must determine upon a comprehensive and efficacious forest policy, and it must do it without delay. Every state should be behind that policy, and national and state governments should go further than they have ever gone to bring the matter to the active attention of business and industrial communities everywhere." In the opinion of the editor of the *Houston Post* "pub-

FOREST POLICY AND A ROOSEVELT MEMORIAL

that will at least in a measure remedy the situation." The *Twin City Sentinel*, of Winston-Salem, N. C., says the "matter is one of immediate importance. It cannot be deferred indefinitely. Something should be done and now." It then quotes in full the article from *The Manufacturers' Record*, of Baltimore, which is based upon the statements of the American Forestry Association. "No mathematical genius is required to see the finish," says *The Advertiser*, of Elmira, N. Y. "Forest products are indispensable in almost every industry and trees are needed for a long list of necessities, from print paper to wagons, from lead pencils to aeroplanes. High cost of lumber means high cost of all these commodities." *The Plain Dealer*, of Cleveland, touches upon the call of war for wood and says "on a far vaster scale America raked her forests for war material. She cut millions of her Douglas spruce of the northwest, and throughout the country she selected the walnuts for special use in aviation. There is as yet no satisfactory indication that the nation is prepared to remedy the damage of war."

In *The Record*, of Philadelphia, we find that the editor believes "the war ought to do something to promote forestry in this country." He calls attention to the fact that two million men who saw the beautiful tree-lined roads of France are now back in this country. "We have got to make systematic efforts to replace the spruce forests on which we must depend for print paper," *The Record* concludes.

As a fitting memorial for these men who have returned and for those who did not return the planting of memorial trees continues to be a very popular subject of editorial comment. "Each year of added growth" says *The Telegram*, of Youngstown, Ohio, "should serve to bring out even more prominently the sacrifice made by the American boys, instead of allowing that memory to die." In the opinion of the editor of *The Leader-News*, of Cleveland, "it will contribute to the beauty, charm and welfare of the country and the happiness of the living, now and in the years to come, while it rears beautiful monuments to the dead." Memorial Tree planting along state highways is urged by *The Journal*, of Pierre, S. D., whom it strikes "as a mighty good scheme for this state." The sentiment is well said in *The Times*, of Flushing, N. Y., whose editor points out that "trees continue to grow and flourish years after the hand that set them out has dropped its working tools." In *The Observer*, of Charlotte, we find that "the planting of fruit-bearing trees along the public highways is an old hobby of

The Observer" which calls attention to the forward step the legislature of Michigan has taken in regard to bordering its highways with nut and fruit trees. *The Vindicator*, of Youngstown, takes up the action of the Michigan law makers and asserts that Ohio is the best state in the Union to do that very thing. *The Dispatch*, of Columbus, Ohio, has an editorial on the

FOREST MEMORIAL FOR ROOSEVELT

(The Houston Post)

As one of the original advocates of the conservation of natural resources, and a zealous worker for the preservation of the forests of the country in particular, the late Theodore Roosevelt is entitled to a large share of the credit for present day sentiment against waste and reckless exploitation of these resources.

Remembering the former president's conspicuous leadership in this movement, the suggestion of Charles Lathrop Pack, president of the American Forestry Association, that the American people observe Mr. Roosevelt's birthday by starting to work in earnest for an adequate national forest policy is most appropriate, and will doubtless meet with general approval among the people.

It has also been suggested that part of the Roosevelt Memorial fund be expended in setting aside a national forest in his honor, a form of memorial that is particularly fitting to the great student and lover of nature, and which would undoubtedly have met with his hearty indorsement, had he been consulted on the matter during his life time. If the American people desire to erect a memorial to him, it would be difficult to select anything more appropriate.

The American Forestry Association is appealing not only for preservation, but conservation, the latter including the renewal of the forests. The Roosevelt memorial is but an enlargement of this idea. If it is carried out, it will be not only a fitting tribute to a great American, whose love of trees and forests was a passion with him, but it will result in great material benefits to the people of the country. Such a memorial is both idealistic and practical—a combination of characteristics which was the source of much of the power for leadership in Theodore Roosevelt himself.

work of memorial tree planting by the American Forestry Association which has been widely quoted throughout the country. In the opinion of the editor of *The Messenger*, of Owensboro, Ky., "systematic nut tree planting and replanting along the roadsides of this country might not be so 'nutty' as it sounds." *The Telegraph*, of Harrisburg, calls attention to what can be done in memorial tree planting if the or-

ganizations having the welfare of a community at heart will co-operate with the American Forestry Association. "The setting out of Memorial Trees is a fine thing" says *The Talk*, of Alexandria, La., in pointing out the possibilities for classes in schools and colleges to plant trees either when they enter or leave the institution. *The Christian Herald*, of New York City, points to what New Bedford, Mass., has done and calls trees a community asset. "It is a splendid idea" says *The Beacon*, of Ashtabula, O., and should be entered into with enthusiasm and interest by the people of this country." *The Courier*, of Lafayette, Ind., urges the people of that city to take up memorial tree planting at once. Memorial Tree planting, in the opinion of the editor of *The News-Times*, of South Bend, is the way for the private individual to do something for posterity. The trees will make the city famous in years to come in the opinion of the editor of *The Republican*, of Shelbyville, Ind., expressed in urging memorial tree planting. *The Democrat*, of Goshen, Ind., enlists in the plea for nut and fruit bearing trees. *The Evening Mail*, of New York City, has an editorial on the planting of fruit trees in Bryant Park and quotes Mr. Pack on the possibilities of utilizing the back yard and vacant lot for providing "fruit f. o. b. the kitchen door." The memorial tree planting movement is a wise one in the opinion of the editor of the *News and Courier*, of Charleston, South Carolina, which calls on the South in particular to take up the plan. "The American Forestry Association," says the *News and Courier*, "is wisely taking advantage of the keen and widespread interest in good roads to promote the cause which it has especially at heart—the cause of reforestation. The Forestry Association's efforts should be pushed and in the South especially it should be given the encouragement which it merits." In *Motor Life* we find the leading article with fine pictures devoted to "Plant A Tree for Remembrance" which tells of the Association's work. The editor also devotes an editorial to the subject. "Let's not stop; let's build the 'Roads of Remembrance' and see that they are lined with magnificent trees" writes the editor of *Motor Life*, who adds that "it strikes a responsive chord in our hearts." Every member of the American Forestry Association should rally to the cause of forestry and write his editor, in the name of the American Forestry Association, thanking him when space is given to forestry, memorial tree planting or like subjects. Then too each member should take the lead in tree planting in his community and report all activities to the Association.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THOSE interested in industries which use trees as their raw material in Canada are taking active steps to conserve and better utilize the existing supplies. On the 14th of October there will meet in Quebec a joint Committee of the Woodlands Section of the Canadian Pulp and Paper Association and the Quebec Limit Holders' Association to discuss recommendations to the Quebec Government for a change in the cutting regulations and legislation leading to compulsory reforestation. All the important lumbering and pulp and paper industries in Quebec, Ontario and the Maritime Provinces will be represented. The discussion will occupy a day and on the morning of the fifteenth a committee of the conference will have an interview with the Minister of Lands and Forests, Hon. Mr. Mercier, to present their views and make recommendations. It is hoped that by mutual discussion and co-operation the government and the wood using industries may work together for the protection, proper utilization and perpetuation of the forests. This getting together of wood-users, foresters and the government should have the best of results.

The report of the results of the expedition headed by Captain Daniel Owen, which explored Laborador timberlands by aeroplane, is very interesting and it is hoped that more details than were embodied in the newspaper dispatches may soon be forthcoming. There is no question whatever that such an expedition could have done nothing in the time taken without aerial transport, but we are anxious to know what landing places were used for aeroplanes, and, if the number of photographs, said by the press reports to have been taken, 300,000, is correct. It has been the experience of those who have visited Laborador that the timber was small and was confined entirely to the river valleys, the hills being either bare or covered with stunted spruce. Volume tables worked up for Laborador spruce show the timber somewhat shorter and smaller, on the average, than that of the territory west of Quebec.

That aerial transportation is ideal for reconnaissance and even for more detailed estimation of forest lands is beyond a shadow of doubt. The writer has made a reconnaissance of over 1,500 square miles from the air and each flight over a country develops one's ability to see more detail and estimate more closely. Sitting in a plane with a map one can mark the areas burnt, those in different types of timber, those which are restocking, etc. The height of the stands can be estimated and a rough

approximation of the proportion of softwood to hardwood in the crown cover. At three thousand to four thousand feet, jobbers' camps and dams can be seen and marked on the map, the drainage of a country and the contour studied and the way in which logs can be taken out of a certain district. A woodlands manager could easily, in a few flights, lay out his winter's operations without difficulty and to far better advantage than in the office.

Where, as in Quebec and Ontario, logging is carried out at long distances from civilization, often from one to two hundred miles, and where rail transportation seldom takes one nearer than 30 or 40 miles, planes would be invaluable for travel to and from the operations, especially for the higher executives who now seldom see anything of woods operations. With a plane a tour of all the operations could be made in two or three days. In case of serious accidents in the woods, injured men could be brought out quickly and as comfortably as if in bed.

The detection and reporting of forest fires is very easy, and during the past season a Johnson gasoline fire pump and 1,500 feet of hose was always ready to be transported to the scene of a fire. In the St. Maurice Valley there is almost always a lake within two to three miles of a fire, on which a landing could be made. As our experience shows that fires nearly always occur on lakes or rivers, the only routes of travel, the planes could almost always reach them. With settlers, campers and berry pickers, the almost daily presence of planes over their operations is the strongest kind of deterrent for carelessness or wilful setting of fires. I think it is safe to say that the seaplane or aeroplane with pontoons will be one of the most important aids to fire protection and forestry work that has so far been developed.

Mr. G. C. Piche, Chief Forester of Quebec, held a conference of the Managers of the Quebec Forest Protective Association on October 20, at the government nursery at Berthierville, and a visit was made to his plantations on the drifting sands at Lachute.

A party of about twenty of the Senators of the Dominion Parliament made a visit to the industries in the St. Maurice Valley and inspected the nurseries and plantations of the Laurentide Company. Senators White and Bostock, who are directors of the Canadian Forestry Association, were especially interested.

Dr. Hewitt, head of the Dominion Entomological branch; Professor Swaine, of the

same branch, and Clyde Leavitt, forester to the Commission of Conservation, visited the co-operative Forest Experiment Station of the Commission and the Laurentide Company, at Lac Edward, Quebec. Mr. Leavitt made the trip from Grand Mere to Lake Edward in a seaplane.

Mr. H. G. Schanche, Forester to the Abitibi Pulp and Paper Company, has commenced work on a map and estimate of their limits and is breaking up ten acres for a forest nursery. Mr. Mills, late of the staff of the Commission of Conservation, has joined his staff.

Lieut.-Col. George Chahoon, Jr., president of the Laurentide Company, and Mr. H. Biermans, president of the Belgo-Canadian Pulp and Paper Company, made flights in the seaplane and expressed themselves as being much pleased with the machine and convinced of its practical value.

Robson Black, secretary, Canadian Forestry Association, is leaving for a trip through the west to address meetings of the Canadian Creditmen's Association. Mr. Black is doing splendid work for forestry along the most practical lines and is rapidly educating the public to the necessity for properly using our forest resources.

Mr. A. D. Gilmour, forester of the Anglo-Newfoundland Development Company, is pushing rapidly a map and estimate of his company's limits and is also handling their logging operations. Base maps, showing lakes and rivers is already completed.

After a 750-mile trip on horseback, through the interior of British Columbia, M. A. Grainger, chief forester, reports the fires during the past season the worst since 1910.

That England with an area of less than the State of New York is planning to invest \$17,000,000 in a ten-year campaign to reforest 250,000 acres of land, inspires Dean Hugh P. Baker, of the New York State College of Forestry, at Syracuse, to comment on the need in New York State of particularly noting England's condition and her plans. Great Britain will replace for future commercial use the timber used in France during the war by this expenditure of many millions, while Dean Baker points out, New York has difficulty even in putting through a plan of co-operation with lumbermen and other private holders for steps toward the growth of timber for the future. He sees in all this a need for a definite forest policy for his state as well as for the nation.

No. 1

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ROBINWOOD, CAL.

By Benjamin King: Capt. Henry Warren Brown.

SAN FRANCISCO

By California Federation of Women's Clubs: Alice A. Fredericks.

MERIDEN, CONN.

By Robert C. Bemis: Leslie Carter Bemis.

NORWICH TOWN, CONN.

By Scotland Road Social Club: Albert E. Dexter, Frank A. Wilcox.

LUTZ, FLA.

By Lutz Women's Club: Boys of Lutz and vicinity.

ORLANDO, FLA.

By Mrs. F. A. Lewter: Sergt. Robert D. Lewter.

HINSDALE, ILL.

By Mrs. Ben Allen Samuel: Grayson Hewitt Brown.

SOUTH BEND, IND.

By Women's Civic League: Fred C. Pearson.

BEREA, KY.

By Woman's Club: John B. Gabbard, Dee Walker, Gentry Kennedy, Cleveland Cady Frost, John E. Harwood.

ANNAPOLIS, MD.

By First Methodist Episcopal Church: Our Heroes First M. E. Church.

NORTH WILBRAHAM, MASS.

By Soldiers Welfare Committee: George M. Kingdon, Nelson S. Vincent, Edward F. Powers, Clarence Green.

SOUTHBOROUGH, MASS.

By Margaret and Caroline Oveson: Capt. G. K. Sabine, Jr.

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By Illinois Avenue School: Pennington Crocker, George Randolph.

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By Mr. W. G. Elicker: Charles S. Montgomery, John E. Williams, Thomas Paulson, Clarence Fanning, Santo Peluso, Joseph E. Macedo, Bertram A. Rowe, Edward Fanning, Petro de Palma.

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By Mrs. A. W. Bertine: William Wiley Hayward.

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By Greenwich Woman's Club: Frank Stiles, Homer Barber, William Steenson, John J. Millett, Joseph Adamson, Eugene Towns, Lester Hyatt, Orin Andrus, Walter Flatley, William J. Welch, William Lyttle.

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By University Club: Charles L. Jacobi, Horace Beal, Peter C. Poach, John Joseph Diminco, Claude Eufel, Ray C. Hollock, Frank Young.

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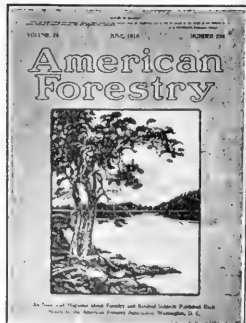
By Woman's Club: Thomas Z. Wagner, James Faylor, John E. Abrahams, Sgt. Raymond V. Martin.

DALLAS, TEX.

By University of Dallas: Joseph Murphy, Joseph Byrne, Orion Keele, J. Wendell Spake. By Women's Forum: R. Wilbur Weaver, Roy E. Mathews, Horace Higginbotham, Eugene M. Ellison, Reed Bodenhamer, Leslie D. Everett. By Council of Jewish Women: Charles Klein, Nathan Black, William Kleinman.

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STATE NEWS

NEW JERSEY

CO-OPERATION along a new line between the Forest Fire Service of the New Jersey Department of Conservation and Development and the State Highway Commission has been entered into with a view to decreasing the number of forest fires originating from highway construction.

The Forestry Department has provided a leaflet entitled, "Forest Fire Prevention and Highway Construction," which calls attention to the danger of using coal and wood burning machinery under any conditions and emphasizing the necessity for adequate spark arrester equipment where these fuels must be used. It urges a substitution of oil fuel or gasoline power just as rapidly and as universally as possible for all such machinery. It emphasizes the need for increased care in using fire for brush and refuse disposal, points out the legal requirements for such fires and makes suggestions as to methods and times of the work. It calls for greater emphasis by those in charge on the necessity for care by employes with smoking materials in and near the woodland areas. The pamphlet is illustrated with 10 cuts, featuring the points particularly stressed in the text.

The State Highway Engineer will hereafter enclose one of the pamphlets when sending specifications to all those bidding on highway work for his Department. Through the Highway Department the Fire Service will also be enabled to reach a large number of other contractors engaged in this sort of work throughout the State.

In addition, the State Highway Engineer is supplying the State Firewarden with the names of all those engaged in road construction and through road inspectors in the field is giving notice of the condition of all steam machinery used on each job, and particular notice of defective machinery or carelessness on the part of the contractor. This will permit the firewarden's field force to personally interview the foreman in charge of each job where the work is in or near the forested areas, and promptly deal with carelessness or indifference where necessary. Both the publication and subsequent personal interviews will point out to the contractors that responsibility rests with them for all forest fires resulting from any cause connected with their work even though by accident, as is provided by the State fire law. They will also be informed of the necessity for fire permits for using open fires for any purpose on the job and of where and how to obtain these permits.

Though the number of fires annually, coming from these sources is not a large

proportion of the total, and although they are among the most preventable, yet where carelessness or indifference on the part of the contractor is found, they have been among the most serious in several instances.

In his annual report, recently submitted to the Governor, the State Firewarden of New Jersey comments upon the fact that of the 796 forest fires, large and small, recorded during the calendar year 1918, responsibility for 434, or 54 per cent, was fixed upon some individual, or agent. There were also 59 cases involving technical violation of the fire permit law without ensuing fires. The penalties collected during the year, without reference to damage claims, amounted to \$2,956. Can any state or section surpass this record of effective fire law enforcement?

NEW YORK

ONE of the largest tracts of forest land ever approved for purchase by the state at a meeting of the Commissioners of the Land Office was acted upon favorably recently when the Conservation Commission's recommendation to purchase the Santa Clara Lumber Company's tract in Township 27, Franklin County, was approved. This tract involves practically 18,000 acres of wild forest land and comprises some of the most scenically beautiful sections of the whole Adirondack region, including the whole of Mt. Seward and Mt. Seymour. As soon as titles to the tract have been approved by the Attorney General's office this valuable area will be added to the Forest Preserve and be reserved for all time for the benefit of the people.

New York State will lead the nation in intensive application of forestry to idle lands, under plans now being formulated in Otsego County.

This county, whose hills and valleys, lakes and streams formed the setting for Cooper's Leatherstocking Tales, is organizing a system of county and township forests, on the basis of a forest survey made by the New York State College of Forestry at Syracuse. The plan is for each township to plant a forest of roughly 100 acres as a starting point, the several forests to be part of a county system, to be connected up with highways to make them accessible from all parts of the county, and all to be in accordance with a general plan. The township forest, however, will be the unit, and it is hoped by the Otsego County Improvement Association to have plans so far advanced that the first planting can be made next spring.

If this is done the New York State College of Forestry at Syracuse will send foresters to direct the work, as preliminary

surveys have already been made. The plan is to plant at least four township forests next spring, and increase the number by planting others in the fall, until all the twenty-four townships of the county will, within a short time, be actually growing trees for future generations.

The townships will buy the land and operate the forests but the organization work is being done by the Otsego County Improvement Association, which is just completing a membership campaign to give it \$25,000 a year for the promotion of this and three other general projects.

This project is probably the first in America for the planting and owning of a communal forest for future economic returns, and will be used by the New York State College of Forestry at Syracuse as a demonstration of the possibilities of forestry in New York State.

"The future of the Adirondacks depends upon the development of its hardwoods."

This declaration by Prof. Edward F. McCarthy, of the New York State College of Forestry at Syracuse, at the conclusion of three months of work with a party of foresters in the western Adirondacks, is his viewpoint upon the problem of forestry in New York State, and his work has a particular bearing upon the pulp and paper industry. Prof. McCarthy was assisted by Prof. H. C. Belyea, of the College of Forestry, and with three assistants the two men spent nearly three months in the Western and Northern Adirondacks where they maintained their camp. Considerable study was made in other portions of the Adirondacks, however, and important results were attained in a study of the reproduction of yellow birch.

The study was devoted entirely to yellow birch, which because of its present use to a small extent in the paper industry, and because of its rapid growth offers a possible solution for the threatening shortage of pulp wood for New York's paper mill investments of many millions of dollars. The study was to determine the value of yellow birch in the future of the Adirondack forest, and the study extended to birch in all types and conditions of forest growth.

The importance of the study is shown by the fact that the war census showed there was only about 5,000,000 cords of soft wood in private hands, the rest being in state forests, not opened for cutting. This would be a supply of only about five years for the mills, if they were not importing in great quantities from Canada to meet their needs.

The importance of birch is not only for its own use, if it can be so developed, but particularly in its relation to other woods, for it has always been a big factor, and will continue to be, in reproduction of any

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forest, as a rapid growing protective cover for the slower growing hard woods.

The study made by the College of Forestry experts was to determine such elements as the rate of growth, reproduction, its relative growth compared to other hard and soft woods, in order to secure definite data on which to base future operations in the forests. The study was extremely detailed, for in some sections strip surveys were made to include every growing tree, even to those an inch in diameter on a typical plot.

That the replanted forest area grows more rapidly than was the case in the virgin forest is now definitely known. Just as the cultivated grain grows and produces more luxuriantly than the same grain prospered in a wild state, so do the trees grow faster, particularly in their early years, than was the case under natural conditions. The virgin forest contains trees which lived 250 to 300 years. Under favorable artificial forest conditions, if a replanted forest can be called artificial, the tree would reach a similar diameter in much less time, and the growth is particularly rapid in the earlier years.

"The future Adirondack forest will be largely hard wood," said Prof. McCarthy, returning from his survey, "and the problem now is to develop the market for the coming hardwood which is replacing the old soft wood forests, so that ultimately the maximum amount of softwood may 'come back' under a policy of conservation."

OHIO

THE annual summer meeting of the Ohio Forestry Society was held at Carbondale, September 12th and 13th. The members of the Society and their friends were the guests of the Carbondale Coal Company who provided an elaborate camp for the purpose.

The program consisted of trips over the forest plantations and the native woodlands of the Company and was supplemented by addresses which occupied one session.

The Carbondale Company is a pioneer in forestry practices. Its surface tract of approximately 3000 acres is mostly timbered. A large portion of the timber required to operate the mines is provided from their holdings. The Company operates its own mill, and all cutting on the tract is made in accordance with forestry principles.

Some 12 years ago, Colonel Richard Endlerlin, president of the Company, undertook to reforest the old fields. The species used were largely tulip poplar, black locust and white and red pines. Definite areas have been planted annually since that time, and the plantings on the whole have been very successful. Considerable data may now be secured from these plantations which is of special interest to coal companies in Southwestern Ohio.

Colonel Endlerlin gave a very interesting talk on "What an Army Cantonment Has Done for a Community." The Colonel was

chairman of the Chillicothe War Board and at that capacity had charge of much of the work in preparing for the large Chillicothe Cantonment. It was largely his executive ability and inherent leadership that made possible such rapid progress in completing this camp.

G. D. Cook in charge of the Cincinnati Municipal Forest told what the 10th Engineers accomplished in the forests of France.

J. W. Calland, Forester of the Miami Conservancy District, gave a splendid account of the big project under way to control the floods of the Miami Valley. The Conservancy District comprises 33,000 acres of land, which is divided into 5 retarding basins. These basins are the valleys of rivers and creeks, the confluence of which is peculiarly conducive to severe floods that have done much damage to the densely populated districts of the Valley in the vicinity of Dayton. The retarding basins are formed by the erection of immense earth dams from 400 to 500 feet in width across the valley at favorable locations. The completion of this project will render impossible the recurrence of such catastrophes as the 1913 flood.

F. W. Dean, Assistant State Forester, spoke of the French forests and forestry.

Edmund Secrest, State Forester, outlined the proposed Federal and State Forestry Program. He advocated:

1. A definite policy for the acquisition by the State of large areas of the rough sterile lands in some of the Southern Ohio counties. Some 250,000 acres could eventually be purchased by the State without the inclusion of any considerable agricultural surface.

2. A greater and more persistent campaign of education coupled with more material assistance to the owners of private woodlands.

3. Acquisition by cities of municipal forests.

4. More systematic and intensive research and experimentation, especially in forest management and utilization. Since the forests of the State are largely farm woodlands the problem of fire protection is not a formidable one, although it should receive attention in certain sections.

WISCONSIN

IN several Wisconsin counties the forest scourge known as white pine blister has secured a foothold to an extent that is causing the State Department of Agriculture apprehension. A field conference was called in Polk, Barron and St. Croix counties to consider means for staying the progress of the disease, and was attended by Commissioner C. P. Norgord, and the acting state entomologist, Dr. Fracker.

Among the men present were forest pathologists of the United States department, Brown and Syracuse Universities, and Prof. L. R. Jones, of the Wisconsin Agricultural Experiment station, in addition.

(Continued on Page 1500)

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

SINCE the last writing the Forestry Club has held two well attended meetings and planned for activities during the semester. A club hike will be taken to Lagunitas and Little Carson Canyons in Marin County on Sunday, October 12th. A large attendance is expected as the route of the trip lies through some very fine bodies of redwood and Douglas fir timber.

A get-together meeting of all students and faculty members of the College of Agriculture was held September 15th. Dean Hunt welcomed the 250 freshmen and the large number of former students and faculty returning from military service. His message to all was "Do something every day, don't just start something."

Professor Walter Mulford is taking a much needed vacation in the mountains of Santa Cruz County.

Professor Donald Bruce has gone to Portland, Oregon, to attend the sessions of the Pacific Logging Congress and Western Forestry and Conservation Association there.

The Forestry Club members are discussing the possibility of resuming publication of "California Forestry," the Club magazine which was discontinued because of the war. It is a big undertaking but a majority of the boys seem to feel that they can put it through successfully.

Ninety men of the Australian overseas forces have come to the University for several months' training before returning to their country. Most of the men are at the farm school at Davis. Lieutenant Norman Jackson, who plans to go into the lumber business with his brother in Australia is registered in several university courses. He enlisted in 1914, went through the Gallipoli campaign and served until the end of the war in France. He has many interesting stories to tell of incidents which occurred during his varied military service.

UNIVERSITY OF IDAHO

MR. C. EDWARD BEHRE, recently returned from a two years' service overseas with the forest engineers, has accepted a call to an assistant professorship in forestry and arrived to take up his work October 1. Mr. Behre is a graduate of the Sheffield Scientific School, and received his master's degree in forestry from the Yale Forest School in 1917, graduating with highest honors. His training and experience fit him admirably for his new position, and he comes to it with strong recommendations from those who know his work.

I. W. Cook, associate professor of forestry, has resigned to accept an important position with a large lumber company. He has been with the School of Forestry sev-

eral years and has rendered both the University and the state splendid service in promoting the cause of forestry.

The ranger course offered by the School of Forestry is designed to meet the needs of rangers and guards wishing to prepare themselves for more rapid advancement; for young men planning to take the civil service examination for the position of forest ranger in the U. S. Forest Service; also for men connected with some phase of the timber industry who wish to acquire a knowledge of the general principles of forestry, but who cannot spare the time for a fuller course.

Young men never had so many reasons for making thorough preparation for their work as right now. This is especially true of those engaged in forestry and the forest industries, as the demand for men trained in these lines is far in excess of the supply, and opportunities for advancement were never better. This course offers a chance to share these opportunities. It is given at a time of the year when you can best get away from your work, yet each session is of sufficient length to enable you to make your training thorough.

Every facility of the School of Forestry is offered to short course students just as fully as to the students of the long course. The equipment for handling the work is complete and up to date. The work will consist of laboratory exercises, actual field practice, and lectures by the forest faculty, Forest Service officials, lumbermen and others.

Admission to classes is without examination. The work is of high school grade, hence any young man who has had the equivalent of eighth grade or grammar school preparation may attend. For further information apply to F. G. Miller, Dean, School of Forestry, University of Idaho, Moscow, Idaho.

NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE UNIVERSITY

SWEDEN, through the American-Scandinavian Foundation, has sent a trained forester, A. E. F. Schard, to the New York State College of Forestry at Syracuse for special study in American methods in forestry, on an inter-change of students by which the United States sent Henry M. Melloney, of the New York State College of Forestry to Sweden for study there. Both men rank as fellows of the American-Scandinavian Foundation, and will get a handsome financial allowance to make possible their securing the best information possible on forestry methods in the countries to which they are sent. Mr. Schard came to this country to study particularly

PULPWOOD TIMBER ON BLACKFEET NATIONAL FOREST MONTANA

The Forest Service calls the attention of paper manufacturers to a tract of timber on the North Fork of Flathead River, within the Blackfeet National Forest, Montana, and approximately 12 miles from Columbia Falls, on the Great Northern Railway. This area contains at least 500,000,000 feet of stumpage, 70 per cent of which consists of Engelmann spruce, hemlock, and other species suitable for wood pulp. Undeveloped water power is available in sufficient quantities for manufacturing purposes.

All information available concerning this area will be furnished upon request by the District Forester, U. S. Forest Service, at Missoula, Montana. The Forest service is prepared to consider terms of sale for this stumpage on a basis which will make the installation of a plant for the manufacture of paper feasible. Inquires are invited.



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timber transportation and commercial phases of forestry, and a special course has been arranged at Syracuse to permit him to do the special work which will be of value to him and promote international relations.

Mr. Schard has been in the Swedish forest service since his graduation from one of the big universities of his native land, and has traveled extensively in Germany and France and other countries studying forestry methods. He is one of the first students ever sent to the United States for forestry study under the operation of the American-Scandinavian Foundation and the recognition given the New York State College of Forestry is accentuated by the fact that this year marked the first time that the Philippine government has sent a student to Syracuse for forestry study, in the person of Luis J. Reyes, who was in the Philippine forestry service six years before coming here for special study.

A surprising demand from American industry for men trained in forestry has been disclosed through the placing of graduates the past few weeks by the New York State College of Forestry at Syracuse. The demand for men not alone from concerns in the lumber industry, but especially from industries using the products of the forest in manufacturing. Announcement has been made of the placing of seven foresters who are returned soldiers, and of three other recent graduates of the College of Forestry in positions applying to practical life the training given in forestry.

OREGON STATE COLLEGE OF FORESTRY

PROF. H. S. NEWINS, who spent more than a year with the Aircraft Production Division of New York, as inspector of timber used in airplane construction, is back in his former position as Professor of Forestry in the Oregon State College. He made the trip from Brooklyn, New York, to Corvallis, Oregon, by auto, covering the distance in thirty days.

Forty members of the School of Forestry attended the sessions of the Pacific Logging Congress in Portland, October 8-10.

P. F. Shen, a junior student of the School of Forestry, who hails from the south of China, is completing his course in the Yale Forest School. Shen plans to cover the principal forest regions of the United States and then return to his own country to aid in working out forestry problems there.

At the sessions of the Pacific Logging Congress, held in Portland, October 8-10, the following Forest School men were in attendance: E. T. Clark, Professor of Logging Engineering, Washington State University; Donald Bruce, Professor of

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Forestry University of California; Dorr Skeels, Dean of the Forest School of Montana; E. M. Buol, Professor of Logging Engineering; H. S. Newins, Professor of Forestry, and G. W. Peavy, Dean of the School of Forestry, Oregon State College. During the Congress these men held a round table discussion relative to the problems peculiar to the western forest schools.

PENNSYLVANIA STATE FORESTRY SCHOOL

PROF. C. R. ANDERSON has been appointed Extension Representative in Forestry. He will continue to give the courses in Management and Finance in the Forestry School and devote a portion of his time to woodlot work in the state.

The enrollment of students in Forestry is as follows: Seniors, eight; Juniors, seven; Sophomores, twenty-four; Freshmen, twenty.

C. B. Davis, '17, is Forest Assistant to H. G. Schanche, '18, Forester, with the Abitibi Power & Paper Company of Canada. L. G. Baltimore, '18, is City Forester of Harrisburg. Charles Claxton, '17, has resumed his position in charge of the Forestry Department at the Lincoln Memorial University, Tennessee. H. E. Richards, '16, and O. B. Gipple, '15, are again with the Wheeler & Dusenbury Lumber Company at Endeavor, Pennsylvania, working under the direction of R. R. Chaffee, Harvard Forest School, 1910, Forest Engineer for the company. Chaffee had charge of the courses in Lumbering at Penn State for several years before engaging in practical work in Lumbering. R. A. Zeller, '15, is Forest Examiner on the Chugach National Forest, Ketchikan, Alaska. He writes that he finds many foot-prints of G. L. Drake, '12, who formerly held this position.

STATES RECEIVE GOODLY PORTION OF NATIONAL FOREST RECEIPTS

THE total receipts of the National Forests of Arizona for the fiscal year that ended on June 30 last were, \$511,380.70, and the receipts of the New Mexico forests for the same period were, \$358,735.69. The Arizona forests ranked second of all the states in receipts, being outranked only by California. New Mexico stood sixth from the top.

Of these receipts the state of Arizona and its counties will receive \$171,928.80 for roads and schools, and \$45,261.18 in addition will be spent by the Forest Service in building roads within the forests. This latter fund is known as the ten per cent fund and is altogether distinct from the \$10,000,000 Forest Service road fund provided in last year's post office appropriation bill.

Of the receipts from the New Mexico forests, the state and counties of New Mexico receive \$104,752.54 for roads and schools, and an additional sum of \$33,864.42 will be spent under the ten per cent provision for roads.



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BOOKS ON FORESTRY

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* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

STATE NEWS

(Continued from Page 1496)

tion to several representatives of the Wisconsin department of agriculture, who acted as hosts.

After going over conditions in Wisconsin, a brief trip was made through the infected area in Minnesota, where conditions are even more serious than in this state. A publicity campaign among pine owners, showing practical control methods, is being started. The progress of white pine blister is slow and hope of limiting its spread is held.

SEED BURNED FORESTS BY USE OF AIRPLANES

THE Forest Service has been urged by Representative Randall, of California, to start a re-forestation program for the fire-denuded areas in the Sierra-Madre Range by using airplanes to scatter millions of tree seeds over these mountains as soon as the rainy season begins. After his conference with Service officials, Mr. Randall wired civic organizations in Pacific Coast cities to organize Forestry Services to press action by the Government.

BOOK REVIEWS

"Forest Products—Their Manufacture and Use," by Nelson Courtlandt Brown. John Wiley & Sons, New York. 471 pages, 120 figures, \$3.75 net. To those who are interested in the chief commercial features involved in the principal forest industries, lumber excluded, this book will be most welcome as filling a much needed gap in American forestry literature on the principles and practices followed in the production of materials which, from the viewpoint of invested capital and value of products, are of greater importance, collectively, than lumber. The subject is presented clearly and interestingly but necessarily with brevity as it would not be possible to treat in detail the many topics covered in one volume. This is exemplified by the following subjects, each treated in a separate chapter: General introduction—Original forests—History of lumber cut; Wood Pulp and Paper; Tanning Materials; Veneers; Slack Cooperage; Tight Cooperage; Naval Stores; Hardwood Distillation; Softwood Distillation; Charcoal; Boxes and Shooks; Cross Ties; Poles and Piling; Posts; Mine Timbers; Fuelwood; Shingles and Shakes; Maple Syrup and Sugar; Rubber; Dye Woods and Materials; Excelsior; Cork. The values and conditions used are, to a large extent, given for the period prior to the participation of this country in the war, Commissioner Brown deeming this advisable because of the wholly abnormal and somewhat temporary conditions brought about by the war itself. Brief bibliographies, which were used to some extent as sources of information, are appended at the end of each chapter, and can be consulted for further study in each subject. Much of the data given have been obtained by Commissioner Brown during his personal investigation and inspection of operations in the South, the Lake States, the Northwest and the far West, while some of the material was collected on his trips to various European countries.

"The Condensed Chemical Dictionary," a reference volume for all requiring quick access to a large amount of essential data regarding chemicals and other substances used in manufacturing and laboratory work. Compiled and edited by the Editorial Staff of the Chemical Engineering Catalog, F. M. Turner, Jr., Technical Editor. The Chemical Catalog Company, Inc., New York. Price, \$5.00. This book differs from the ponderous reference books of the technical laboratory in many respects other than its small size and compactness. It is written for the business man, the lawyer—the man in the street with only a slight knowledge of chemistry, as well as for the professional chemist. Information of all kinds, some of it not

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FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden's force, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is \$1,200 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the summer for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years' experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Care furnished by reference. Address Box 860, care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in forestry; salary \$1,500 to \$2,000. Best of references. Address Box 675, care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumbering railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, Ithaca, has experience in orchard work, clearing, land improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of grade roads, and general farm work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience in forestry work. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

WANTED—Position as Forester and Land Agent. Technically trained Forester, 35 years of age. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 810, care American Forestry, Washington, D. C.

WANTED—Position, with Lumber Company or Private Consulting Forestry, for trained Forester with five years practical experience. Box 820, care American Forestry.

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strictly chemical, is packed in its more than 500 pages—fire risk in shipping, kind of containers employed, commercial uses, and the like—and yet it is so scientifically accurate that it will no doubt be added to every library on technical chemistry. The mystery of the alchemists still obtains in the field of chemical nomenclature and terminology to the average man. The Condensed Chemical Dictionary is especially designed to make chemical terms available and understandable to this audience, and is admirably fitted to do this by the editor, F. M. Tume, Jr., and his several technical advisers.

"Timber—Its Strength, Seasoning and Grading," by Harold S. Betts. McGraw-Hill Book Company, Inc., New York. 234 pages, 27 tables, 107 illustrations. Price \$3.00. In readily accessible form, this book presents important technical data and

formation on wood. This is the first adequate book on wood as an engineering material. It treats the subject in a direct, practical way.

As indicated by the subtitle, the book covers testing, seasoning and grading. Both hard and soft woods are considered. The data given are derived almost entirely from tests and investigations on the mechanical properties of wood made by the Forest Service of the United States Department of Agriculture. The material may therefore be regarded as reliable.

The various chapters cover:

I. Timber Resources of the United States. II. The Strength of Wood. III. Effect of Moisture and of Preservative and Conditioning Treatments on the Strength of Wood. IV. Strength of Wooden Products. V. Seasoning of Wood. VI. Grading of Lumber by Manufacturers' Associations. VII. Lumber Produced and Used in the United States.

The information offered is invaluable to every man who uses, sells or manufactures wood and wood materials.

"The Hidden Aerial," by Lewis E. Theiss. W. A. Wilde Company, Boston, Massachusetts. 332 pages. Price, \$1.35 net. This story will appeal to any boy who likes life in the open, or who is interested in radio communication. Primarily it is the story of a band of boys who enlisted in the boys working reserve to serve their country during the war; secondarily it is the story of a wireless spy hunt. Some of the characters which Mr. Theiss has introduced in his other wireless stories appear in this volume, for, being too young to engage in other war work, they joined the boys working reserve for service on the farms. However, their wireless training serves them well when called upon to engage in a hunt for hidden wireless apparatus.

It is an interesting story, with clean, wholesome characters, ever alert, ever anxious to play their part in every adventure which comes.

The volume is illustrated with color frontispiece and black and white illustrations.

VERDE STRIP ADDED TO NATIONAL FORESTS

PRESIDENT WILSON has signed the proclamation which adds the so-called "Verde Strip" to the Coconino and Prescott National Forests in Arizona, according to word received by the local district office of the Forest Service. The total area added is 179,290 acres, and extends along the Verde River from below Rutherford to above Cottonwood. The addition was made chiefly because the Reclamation Service desired to have this area brought under Federal regulation and control in order to protect the Verde watershed from overgrazing and erosion. The stockmen and settlers within the area were favorable to its addition to the National Forest territory adjoining.

R. H. RUTLEDGE PERMANENTLY IN CHARGE OF DISTRICT ONE

PERMANENT adjustment of the executive forces of district No. 1 of the Forest Service, as approved by the Secretary of Agriculture and the Forester at Washington, D. C., have been announced at the Missoula headquarters of the district.

First and most important of all is the appointment of Richard H. Rutledge as District Forester in charge of all national forests in Montana and northern Idaho. Mr. Rutledge has been acting District Forester since the departure of F. A. Silcox in the summer of 1917 and his appointment as Chief of the district is now made permanent, a fact which is especially pleasing to his subordinates and his many friends in Missoula and vicinity.

Mr. Rutledge is a veteran of the Forest Service, having first entered it as a ranger at Fayette, Idaho, in 1905, 14 years ago. In 1907 he was appointed supervisor of the Coeur d'Alene forest, and in the fall of 1908 came to Missoula as Assistant District Forester of operations in the district, and has remained here since. In 1910 he became Chief of the Department of Lands, remaining in that position for four years until transferred back to operations in 1914. As mentioned before, he succeeded Mr. Silcox when the latter left for Washington in 1917.

COMMENT ON TROPICAL WOODS

REFERRING to an article which appeared in the August issue of AMERICAN FORESTRY, entitled, "Uncle Sam, Lumberman, Canal Zone," Mr. C. H. Pearson, an expert on foreign and domestic cabinet woods, makes interesting comment. Mr. Pearson said in part: "Lignum vitae does not grow in the Canal Zone, nor are cacti found there as shown in one of the illustrations. The other scenes are probably from Porto Rico or Cuba where this Almendro de la India is planted as a shade tree. The Lignum vitae referred to by the author is a spurious variety called locally Guayacan, which happens to be the Spanish name for true Lignum vitae. Not a pound of this wood was ever used by any of the Navy Yards in this country, because it was found entirely unfit for the purpose intended. The Almendro to which the author refers in the text is a native forest tree of large proportions and is botanically distinct from this introduced species illustrated and locally called Almond. Special attention is called to the grotesque shapes assumed by these trees as a result of the tropical winds, but the traveler in Panama is well aware that there are no localities in the Republic where the wind is permanently in one direction which would give shade trees this form and outline. This is another reason to believe that the pictures were taken on the south coast of Porto Rico or some other island of the West Indies."



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SCHOOL BOYS MOBILIZED IN REFORESTATION PLAN

MOBILIZATION of thousands of youngsters for service in systematic flood control work around Los Angeles has been completed. In addition to obtaining co-operation of the principals of the high schools, County Forester Flintham was authorized by the Board of Supervisors to obtain 200,000 young trees for planting back of piling defining the stream channels. These will be of hardwood varieties, which will establish themselves firmly without spreading into the stream channel.

In the seed-gathering campaign beginning immediately, there will be a systematic plan. Approximately fifty boys a day will be kept on the job indefinitely. The gathering of seeds is authorized by the school principals and will be done in school time under the direction of teachers of the schools from which the boys come. Some twenty varieties of brush seed will be gathered for planting in the areas swept by the recent forest fires. It has been found that considerable care will have to be exercised in

planting the seed, as the warm weather following the first big rain of the season made a crust over the hillsides. The seed will have to be raked in to be effective.

SCOPE OF THE FOURTEENTH CENSUS EXTENDED

THAT the Fourteenth Decennial Census, on which the actual enumeration work will begin January 2, 1920, is to be the most important ever taken is shown by the fact that the Act of Congress providing for this census expressly increased the scope of the inquiries so as to include forestry and forest products, two subjects never covered specifically by any preceding census act.

The compilation and gathering of forestry and forest products statistics will be in charge of a special force of experts. The accurate and comprehensive figures gathered concerning this vital natural resource will be much in demand, and the comparisons made with conditions existing before the war will be of great interest.

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REFORESTATION OF PORTO RICO IS PLANNED

THE reforestation of Porto Rico along scientific lines is about to be undertaken. Robert Murray Ross, an expert in forest planting, recently arrived at the experimental station in Rio Piedras, fully equipped to undertake the big problem, but had barely entered upon his duties when he was offered a position in Santo Domingo paying him a very much larger salary and so resigned to accept the Santo Domingo position. E. Murray Bruner, Supervisor of the U. S. Forestry Service in this island and Chief of the Porto Rico Forestry Service, in writing of the practical plans to be inaugurated, says:

"This is a work of immeasurable magnitude in its importance and possibilities. The field is unlimited, while the need is immediate and urgent.

"There is no country in the Western Hemisphere in more acute need of extensive reforestation than Porto Rico. The inhabitants of no other part of America suffer so much from the deprivation of essentially needed fuel wood, native lumber and related forest products. Nowhere else is the per capita consumption of wood so small as in Porto Rico. Nowhere else has deforestation, due to destructive methods of exploitation become so nearly complete. Originally as completely covered with as rich a forest as could be found in this part of the world Porto Rico today presents the sad spectacle of a country literally stripped of its forest wealth and entirely dependent upon importation of all classes of lumber and construction timber while more than 50 per cent of the total land area lies completely idle except as it supports a practically worthless growth of coarse grasses and brush.

"The cost of substantial and comfortable homes built of wood has become so exorbitantly high as to be out of reach of even the moderately well to do, while the poor can aspire to no home superior to a miserable shack built of scraps of wood and other cast away materials. Rents are excessively high. Fuel wood is so scarce and costly that the poor must depend upon such fagots and twigs as the women and children are able to gather up in their tiresome and incessant searches, even the heavier and harder portions of the palm branches being eagerly sought. Poles, posts and fencing materials can hardly be had at all. Even the small sized cross ties required by the new narrow gauge railroads must be imported from Santo Domingo, the scrubby and generally despised mesquite under the dignified name of "bayahonda" furnishing the bulk of these ties which cost the consumer about one dollar per tie. Sawmills for the manufacture of native lumber are unknown. Lumbering as an industry has disappeared.

"And in the face of all this we are confronted with the absolute fact that the sup-

ply of southern yellow pine upon which we are so nearly completely dependent for all ordinary construction, will be exhausted, in so far as the general market is concerned, within 14 years, and that within five years the remaining original supply will be in the hands of so few mill operators that effective competition in prices will have disappeared.

"The time is at hand when the people of Porto Rico must arouse themselves to this deplorable economic and social condition, for it vitally affects every home, every individual in the Island. Earnest energetic and concerted attention must be directed at once to the solution of the forestry problem. And the only solution must come through the intensive practice of reforestation on a large scale, the planting of fuel-wood, and lumber producing trees on thousands and hundreds of thousands of acres of idle lands from which the once potentially rich forests have been so destructively removed.

CARRIER PIGEONS AID FORESTERS

DURING the recent severe forest fires in certain sections of the West, carrier pigeons were successfully employed to convey messages from the fire fighters "at the front" to headquarters. The test of the birds for this use was on a limited scale but has encouraged the Forest Service officials to believe that they can be employed profitably on a larger scale.

The experiment lends special interest to a plan which is being considered for co-operation between the Department of Agriculture and the Navy Department, under which carrier pigeons and equipment of the latter department may become available. To establish a successful carrier pigeon system it will be necessary to lay plans during the coming winter, to have the posts properly located, and get the birds acclimated and begin their training. Flights of 600 miles in a single day have been made, while a distance of 140 to 200 miles means a two or three hour flight for the average bird. Since the distances which would be covered in Forest Service work are considerably less than this there appears to be no difficulty in this regard. In most instances the flights from fire fighting areas to headquarters would be considerably less than 50 miles. The value of the birds would be particularly great in mountainous regions where travel is difficult.

FOREST FLYER KILLED

LIEUT. J. WEBB, of Glendel, California, was killed, and Sergt. John C. McGinn, of Salt Lake City, was seriously injured when the airplane Lieutenant Webb was piloting fell in a tail spin and crashed to the earth at Medford. The aviators were on fire patrol duty.

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American Forestry

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the
Christmas
tree wisely and
hereby display the right
Christmas spirit. Each year
thousands of dwellers in towns and
cities, near the National Forests or privately
owned forests, turn to these tracts for trees which
are to be the central feature in Yule-tide decorations. Whether
the trees are cut in accord with the recommendations of the
Forest Service and State Forestry Departments no harm is done, but
the tendency of many is to lash into the growth without regard to
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be one which is part of a group of trees of comparatively compact growth
rather than a more or less isolated tree, the absence of which would make
a decided gap that future growth could not fill. To follow this rule, of
course, prevents the wholesale tripping of wooded tracts, which is done in
many instances. Objection is sometimes made to selecting for Christmas
purposes a tree standing close to others, because the one chosen is apt to be
unsymmetrical, the lower branches being irregular and unattractive. This
difficulty can be overcome by selecting a tree several feet taller than
the height desired and cutting off the lower end. By using only
the upper portion well-shaped, pleasing ornament can be
obtained, and at the same time a selection is
made which results in no harm to

the forest. Very large
trees selected
for municipal
celebration
or church use
need not be sym-
metrical in their natu-
ral state, as they can
easily be made so by boring holes

in the trunk and inserting sufficient limbs of proper size to give the tree a well-rounded
appearance. Frequently where a large tree is to be carried considerable distance,
practically all the limbs are cut off and then replaced in the manner indicated.

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watershed; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people, that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products, employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions, that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the State, especially in forest fire protection.

State Activity by acquisition of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal State and fire protective agencies, and its encouragement and extension individually and by co-operation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquisition of waste lands for this purpose; and also planting by private owners, where profitable and encouragement of natural regeneration.

Forest Taxation Reforms, removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners, aid the lumberman in achieving this. Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes; and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal National and State appropriations for this work.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor



IN STRONG CONTRAST TO THE GLEAMING HEIGHTS ABOVE ARE THE SENTINEL TREES WHICH NESTLE AT THE FOOT OF THE FAMOUS MISSION RANGE IN MONTANA

DECEMBER 1919

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CHRISTMAS ON MOUNT RAINIER

AMERICAN FORESTRY

VOL. XXV

DECEMBER, 1919

NO. 312

NATIONAL FORESTS AND THE WATER SUPPLY

BY SAMUEL T. DANA*

FEW people need to be reminded that the prosperity of the West depends largely upon an adequate supply of water for irrigation. Water, rather than land, is the open sesame to the agricultural development of the semiarid regions. Vast areas of rich soil await only water to make them "blossom like the rose." To other vast areas water has already been brought from varying distances, and these are now among the most productive of all our agricultural lands. Irrigation alone is responsible for the sugar-beet fields of Utah, the alfalfa fields of Idaho, and the orange groves of California.

So literally has water meant wealth to the Rocky Mountains and Pacific Coast States that the "Golden West" no longer need base its claim to the title on the magic metal that brought it fame and prosperity in the early days. The gold of the grain field and of the citrus grove is now worth more than the gold of the mine. The \$247,000,000 which represents the annual value of the crops produced on the 150,000 farms comprising the 13,200,000 acres of irrigated land in the West is nearly three times as great as the value of the precious metals produced annually in the same region. Colorado, preeminently a land of minerals, now produces each year on irrigated lands a

crop worth more than the entire product of its mining industries and approximately twice as much as the output of precious metals. California, the "Golden State," contributes annually nearly four times as much wealth in crops as in precious metals.

If the precipitation were as evenly distributed in the West as it is in the East, there would not be the need

for irrigation that now exists, and the main purpose of the National Forests would be simply timber production. But it is not evenly distributed, and that is where the trouble lies. Except for a narrow strip along the Pacific Coast from San Francisco north to the Canadian line, the great bulk of the precipitation occurs in the mountains.

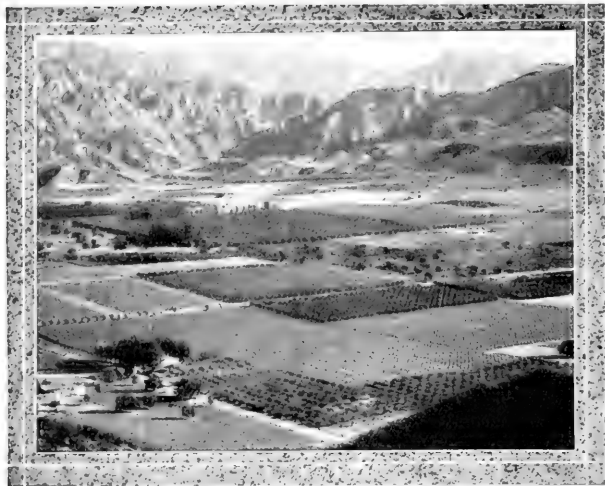


HOW THE FOREST GIVES SERVICE

What the National Forests mean to the water user may be summed up in one word "service"—service that is none the less real because it is not always obvious and because its exact value can not always be expressed in dollars and cents. Every user of water which originates in the National Forests—and this includes by far the greater number of water users throughout the West—must look to the Forests for safeguarding his supply.

Throughout the Coast Ranges, the Cascades and Sierra Nevadas, and the Rocky Mountains and Colorado Plateau the rain and snowfall is far greater than in the intermediate valleys and plateaus.

The result is that the majority of water users depend for their supply on water that originates a considerable distance away. Some of the most productive agricultural lands in the region receive hardly more than enough precipitation to support a desert vegetation, while the evaporation is correspondingly great. Greeley, Colorado;



WHAT WATER WILL DO. WITH—WHERE THE ORANGES GROW

The orange groves and other irrigated lands in the foreground obtain their water from the mountains in the background, which are included in the Angeles National Forest, California. At the lower elevations these mountains are covered with a dense growth of brush, or chaparral, while at the higher elevations are forests of western yellow pine, Jeffrey pine, and other trees. The value of citrus fruits produced in the eight southernmost counties of California in 1914 is estimated by the Los Angeles Chamber of Commerce to have been \$53,000,000.

Provo, Utah; Phoenix, Arizona, and Fresno and Riverside, California, all of which are in the center of extremely productive sections, have an annual precipitation of less than 15 inches with an annual evaporation from a free water surface at least three or four times as much.

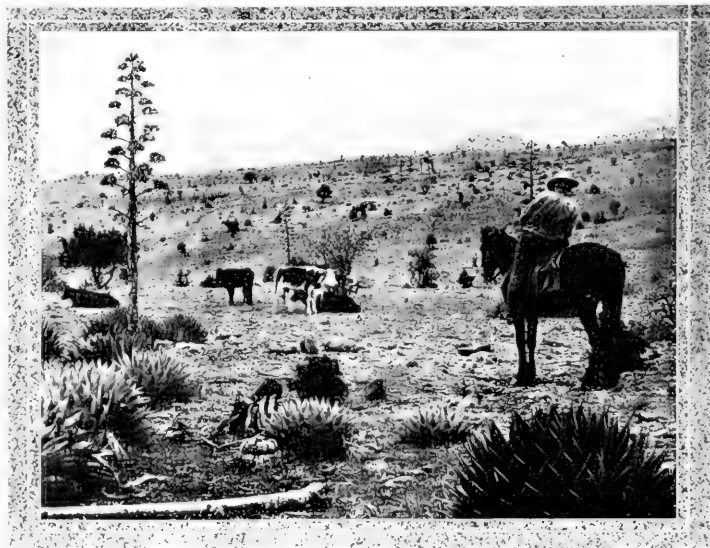
As a natural consequence of the difference in amount of precipitation in the mountains and at the lower elevations, the former are generally forested and the latter treeless. The National Forests, of course, are located in the mountains, where the trees are. From the brush-covered foothills of the San Jacinto and San Bernardino Mountains in southern California to the magnificent Douglas fir forests of the Olympic Mountains in northern Washington, and from the pinon and juniper stands of the southern Rockies in New Mexico to the pine forests of the northern Rockies in Montana and Idaho, the mountains and the National Forests coincide.

An intimate relation exists between the National Forests and irrigated lands throughout the West. At least 85 per cent, and very likely more, of the water

used to irrigate these 13,200,000 acres, whether it comes from surface streams and lakes or from underground sources, has its origin in the mountains where the National Forests are located. Obviously, not all of this mountain area is forested, nor is all of the forested area under Federal ownership. At the same time, the National Forests include a large part of the area from which the bulk of the irrigation water is derived, and must therefore exert an important influence on the amount and character of the supply.

No figures are available as to the exact value added to these lands by the application of water, but it unquestionably runs into the hundreds of millions of dollars. Without water much of this area would be practically worthless, and the value even of that portion on which dry farming is feasible would be greatly reduced. In the vicinity of Salt Lake City, Utah, for example, irrigated lands deriving their water from the Wasatch National Forest are valued at from \$100 to \$1,000 per acre, with an average of probably \$400 per acre; while land without water in the same district, except where it requires drainage, is

practically valueless. Near Los Angeles, California, unimproved lands with water rights are worth from \$200 to \$500 per acre, while bearing orange or lemon groves may be valued at \$3,000 or even more per acre. What the water supply protected by the Angeles National Forest

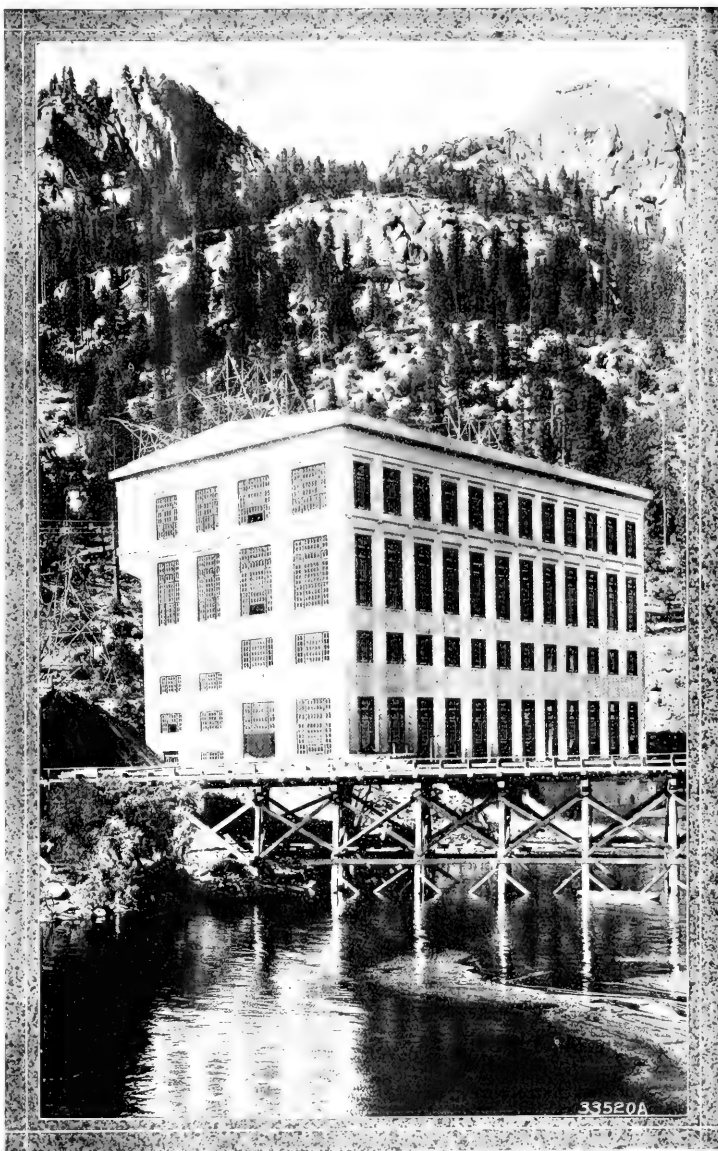


WITHOUT—WHERE THE AGAVES GROW

Semi-desert land near Silver City, New Mexico, now used during part of the year as stock range. If irrigation were possible many of the desert areas throughout the West could be converted into fertile agricultural land. Water, rather than soil, is frequently the decisive factor in determining whether cultivation is practicable.

means to this region is also well illustrated by the value of the crops produced on irrigated lands that without water would be of little or no agricultural value. In 1915, 25,750 acres devoted to citrus fruits, alfalfa, and sugar beets, deriving their irrigation water from the San Antonio watershed, with an area of only 24 square miles, yielded crops valued at \$5,400,000; while 5,870 acres of citrus fruits, deriving their water from the San Dimas watershed, with an area of only 18 square miles, yielded crops valued at \$2,600,000.

Irrigation represents one of the vital needs for water in the West, but there are others. Water is the "white coal" which furnishes or will furnish the motive power for lighting systems, trolley lines, and manufacturing plants everywhere in the Western states. As such it constitutes an immensely valuable resource. The western mountains contain more than 72 per cent of the potential water power of the United States. Through lack of markets, only a comparatively small part of this has been utilized, but in the last 20 years great strides have been made in development. In the decade from 1902 to 1912, for example, water-power development in the Western states increased 451 per cent, or more than four times as rapidly as in the rest of the country. How rapidly water power is developed in the future will depend solely on how many new industries and people make their home in the West. Judging by how many have gone there in the past, the demands of the Western states upon their "white coal" will continue to multiply. No less than forty-two per cent of the water power resources of the eleven Western states, or approximately 31 per cent of the water-power resources of the entire country, is actually within the National Forests. Moreover, a large part of the remaining power, although developed outside of the Forests, is derived



WHERE "WHITE COAL" IS TRANSFORMED INTO ELECTRICITY

A power plant on the Sierra National Forest, California. The pipe line has a drop of 2,000 feet. The National Forest contains 42 per cent of the water power resources of the West. These can be developed by private interests upon payment of an annual charge and under restrictions that protect the public against monopoly.

from streams rising in them. In 1915 nearly 42 per cent of the water power already installed was developed by plants some part of which occupied National Forest lands or which were directly dependent on storage reservoirs constructed on National Forest lands, and 13.6 per cent more was similarly dependent on other public

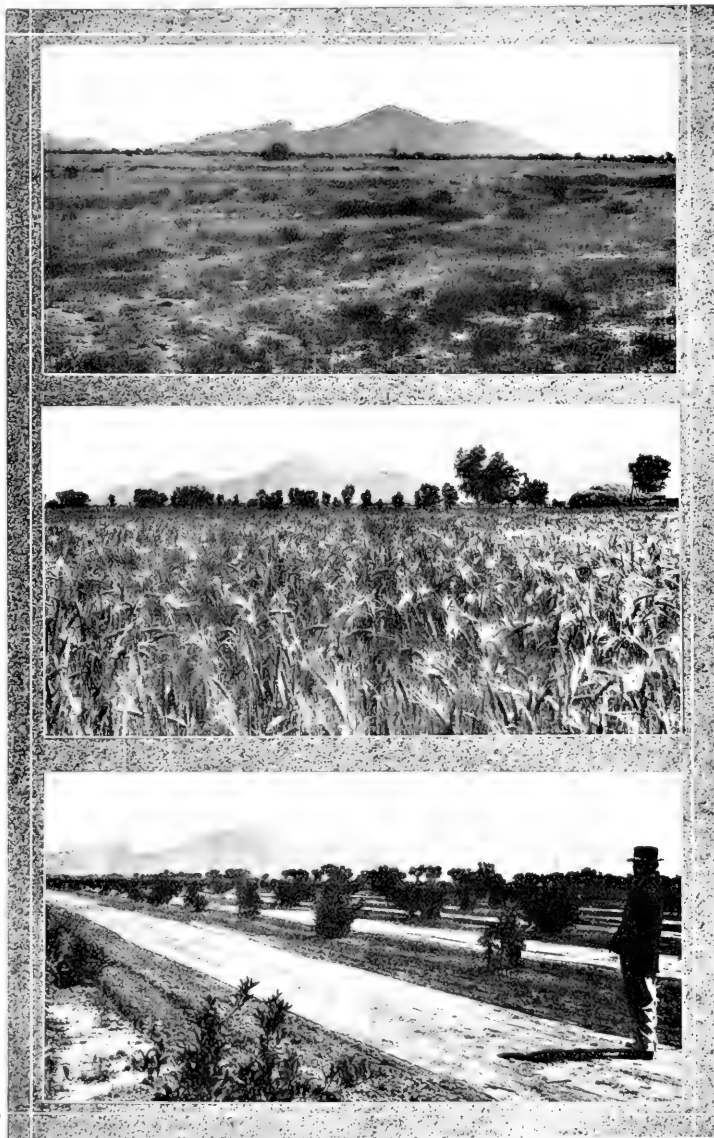
lands. Even these figures, however, do not bring out the full significance of the National Forests in their relation to the water-power resources of the West. A large part of these resources outside of the Forests are so located as to be extremely difficult of development under present conditions, and so a continually increasing proportion of new water-power developments is utilizing sites within National Forests or other public lands.

Farther downstream, in the lower reaches of the rivers and in the harbors into which they flow, water contributes still further to western prosperity. Inland water transportation in the Mountain and Pacific states will never attain the development of which it is capable in the Eastern and Central states but it is already of considerable importance, and should become increasingly so as the population grows denser and traffic correspondingly heavier. According to the 1916 report of the Chief of Engineers, United States Army, there were at that time some 26 navigable streams in the Western

States, with a navigable length of approximately 1,746 miles and an annual movement of over 14,000,000 tons valued at more than \$250,000,000. The relation of the

National Forests to navigation is not strikingly obvious, since practically all the navigable portions of western streams lie outside of the Forest boundaries. Yet by far the greater part of the water that they carry originates in their upper courses, which are to a large extent included within the National Forests. Any influence that the Forests may exert on this water is therefore felt indirectly, but none the less surely, by the streams and by the harbors into which they flow.

Ordinary drinking water may lack the romantic associations of some other beverages, but it nevertheless is an everyday necessity for thousands of families scattered on farms and ranches and in numerous small settlements throughout the



BEFORE AND AFTER

Upper.—A portion of the Salt River Reclamation Project in southern Arizona previous to irrigation, covered only with a sparse growth of desert vegetation.
Center.—The same area after water has been applied, covered with a vigorous crop of barley.
Lower.—The same area several later, covered with a thrifty young orange grove.

West and for the still larger population comprised in the towns and cities. How much effort and money must be expended by western cities in obtaining a pure and

abundant water supply is shown by the examples of Los Angeles and San Francisco, the first of which has considered it worth while to spend some \$25,000,000 to bring water from Owens Valley on the east side of the Sierras across 250 miles of desolate and rugged country; while San Francisco is going back 190 miles into the fastnesses of the Sierras at an estimated cost of \$77,000,000 in order to get its supply from the famous valley of the Hetch Hetchy.

Some 732 western towns and cities, with an aggregate population of 2,265,000, depend on the National Forests for their domestic water supply. This does not include, of course, ranches and small settlements equally dependent on the Forests, nor the towns and cities securing their domestic water from streams and underground supplies which are at some distance from the Forests, but which rise from sources within them. Denver, Colorado; Salt Lake City, Utah; Los Angeles, California, and Portland, Oregon, are conspicuous examples of large cities which are insured a pure

and abundant water supply by the National Forests. So important is this function of the Forests that many communities have entered into co-operative agreements with

the Forest Service for the better protection of the watersheds from which they get their supplies.

Perhaps the most obvious relation that exists between forests and water is the tendency of the tree cover to check erosion. The leaves and branches of the trees prevent the rain from beating upon the soil as it does in the open; the cover which they afford delays the melting of snow in the spring; the upper layers of the forest soil act as an enormous sponge that absorbs large quantities of water which in turn are passed on to the great reservoir of mineral soil beneath; and finally, the surface cover of stumps, fallen twigs, branches, and even whole trees acts as a mechanical obstruction to prevent rapid run-off. The



THE DESERT BLOOMS

Upper.—With and without—a striking illustration of the transformation worked by the application of water. The dry land outside of the fence on the Minidoka Reclamation Project is a sagebrush desert; that inside, a fertile field of alfalfa.

Lower.—An apple orchard on the Boise Project of the Reclamation Service in Western Idaho on land formerly covered with sagebrush.

surface run-off from forest areas is less both in total amount and in velocity, than that from similarly situated unforested areas. The steeper and more rug-

ged the topography, the more marked is this contrast.

In hilly country some erosion is, of course, inevitable under any conditions. When the soil cover of trees, underbrush, and litter is kept intact, however, this is more often beneficial than otherwise, since only the lighter soil particles are washed away, to be later deposited in the more level lands below, adding to their fertility. But when this protective cover is interfered with, whether by fire, destructive lumbering, overgrazing, or injudicious clearing of land for agriculture, the proportion of coarser, infertile materials washed away increases greatly and transforms erosion from a constructive into a dangerously destructive force, difficult of control and capable of doing untold damage.

From the standpoint of the water user, the tendency of the mountain forests to prevent erosion is of the utmost importance.

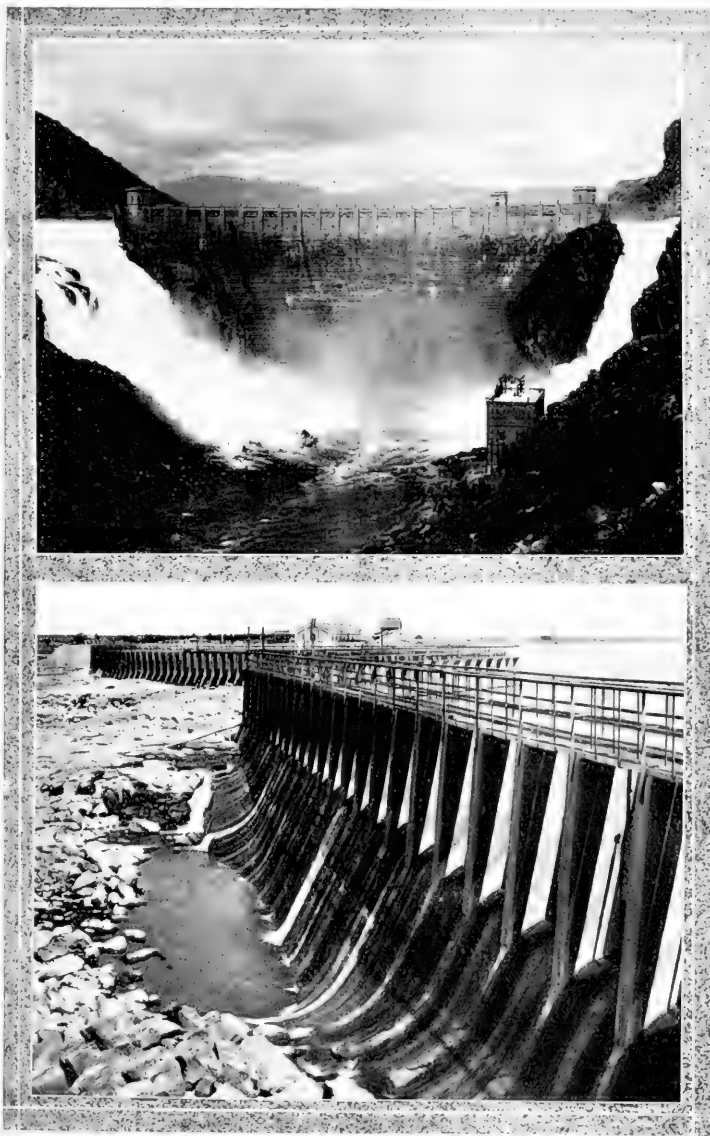
Wherever storage reservoirs must be used, whether for municipal supplies, irrigation, or water power, they are exposed to the ever-present danger of silting up. Every bit of soil

brought down by the streams and deposited in them reduces their capacity and consequently their effectiveness by just so much. This sedimentation is serious

under any condition, but doubly so when, as not infrequently happens, no other satisfactory dam sites are available and the reservoir can not be replaced at a reasonable cost.

Water heavily laden with eroded material often decreases the efficiency and increases the cost of maintaining diversion dams, pipe lines, flumes, canals, and other irrigation works. Sometimes such water damages the crops to which it is applied, and not infrequently it seriously injures or even ruins the land by burying it under a mass of sand, gravel, boulders, and other infertile debris. Excessive erosion may interfere seriously with navigation by filling the streams with material which is deposited in their lower reaches and in

the harbors into which they empty. The action of the forest in reducing surface run-off tends also to regulate the flow of streams. Instead of rushing away in uncon-



WATER FOR IRRIGATION AND POWER

- Upper. Roosevelt Dam and power plant (in right center foreground). This reservoir stores 1,140,000 acre-feet of water and, together with the Verde River, furnishes the water supply for the Salt River Reclamation Project in southern Arizona. The bulk of the water for the project originates on the Grand Canyon National Forest and the White River Indian Reservation.
- Lower. Minidoka Dam and power plant. This dam supplies water for the irrigation of 120,300 acres on the Minidoka Reclamation Project in southern Idaho. The electricity developed at the power plant is used on many farms for lighting, heating, and cooking.

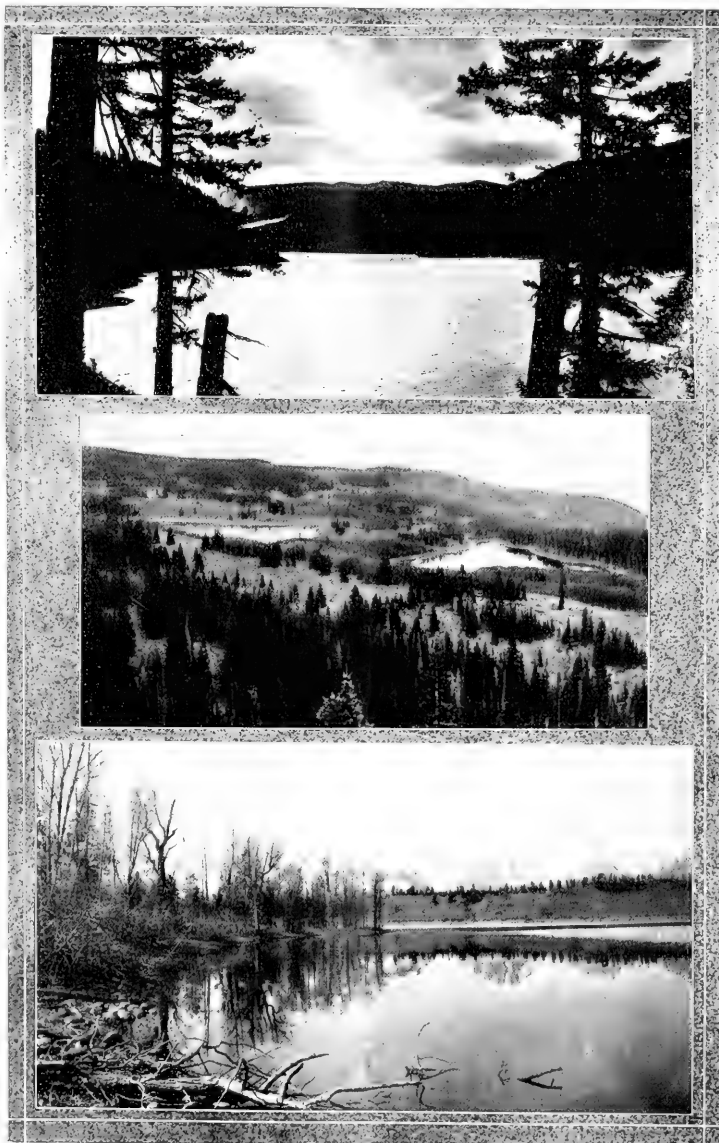
rollable torrents the water is absorbed into the great reservoir of mineral soil, from which it is gradually paid out to the springs and streams. This tends to decrease the high water run-off and to increase the low water run-off. Both results are good. The decrease in the high water run-off means that there is less danger of destructive floods and less waste of valuable water; while the increase in low water run-off means that a larger supply of water is available during the dry season, when it is particularly needed. It is the low water flow that to a great extent determines the availability of any given supply for municipal use, irrigation, or hydroelectric development, and anything which will increase this flow is therefore a factor of prime importance.

What One National Forest Does.

A typical example of the ways in which the National Forests benefit the water user is furnished by the Pike National Forest in Colorado. This Forest extends along the main range of the Rocky Mountains from somewhat north of Denver to south of Colorado

Springs, and includes within its boundaries a considerable portion of the headwaters of the South Platte and Arkansas Rivers. Irrigation by means of water coming

from the mountains included in the Pike National Forest had its modest beginnings in 1860 along the South Platte River in South Park and also near Denver. Since then the area on which irrigation is practiced has grown steadily, until now it is estimated at some 400,000 acres, valued at about \$40,000,000 and with an annual crop production of over \$10,000,000. On many acres where water is not available dry farming is practiced, but the results are uncertain and the yields much less than on irrigated land. The value of water in this region is so great that the natural flow of the streams is greatly over-appropriated, and there is need for every additional drop that can be developed or stored. Practically all of the Great



IRRIGATION RESERVOIRS ON THE NATIONAL FORESTS

Upper—Lake Keechelus on the Wenatchee National Forest, Washington, used as one of the storage reservoirs for the Yakima Reclamation Project. When completed, this project will include more than 146,000 acres of irrigated land. The crop production in 1915, on about two-thirds of the area ultimately irrigable, was valued at \$2,400,000.
Center—Granby Lakes on the Battlement National Forest, Colorado. This Forest was created in 1892 at the request of local residents to protect their supply of water for irrigation and domestic use. Within its boundaries are now some 400 reservoirs supplying about 140,000 acres of irrigated land valued at more than \$2,500,000.
Lower—Jackson Lake on the Teton National Forest, Wyoming, with the Teton Mountains in the background. This forms one of the main storage reservoirs for the Minidoka Reclamation Project.

Plains lying east of the Rocky Mountains is potentially agricultural land, and the only limit to its development is the amount of water which can be secured for irriga-

non. So well recognized is the part played by the forest cover in protecting the water supply that in one case an organization of farmers has protested

reservoir, Lake Cheesman, with a capacity of about 26,000,000 gallons and a watershed of 1,152,000 acres, in the heart of the Pike Forest. Colorado Springs has a

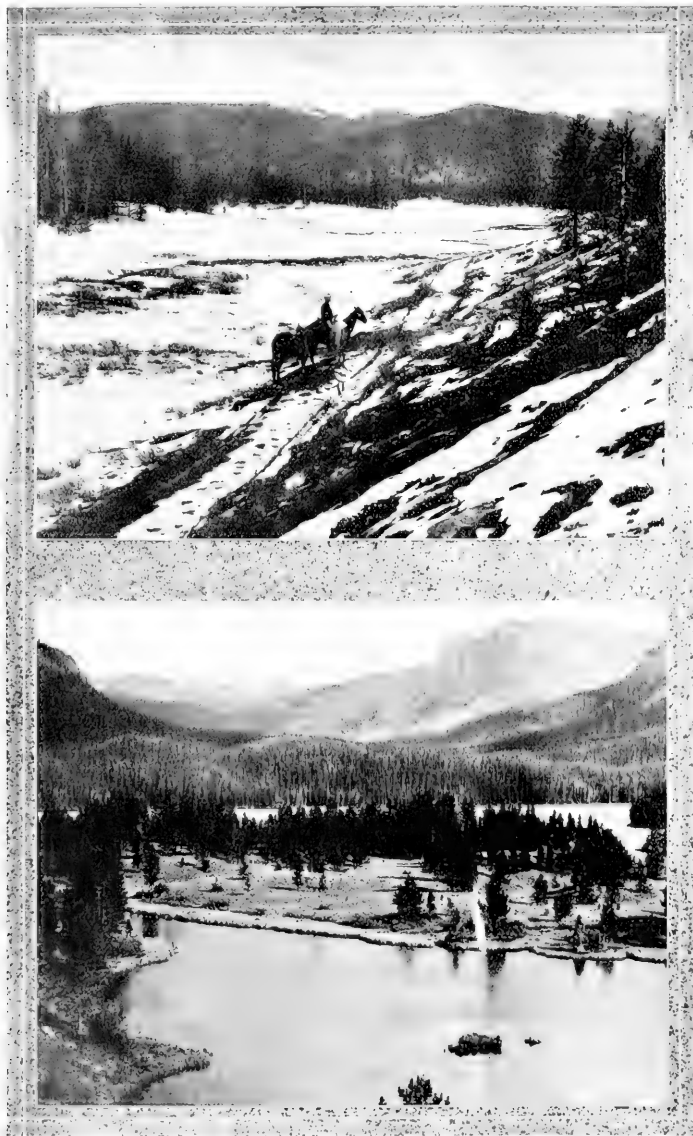
series of reservoirs which also get their supply from the Pike. Altogether, some 35 cities and towns with an aggregate population of 275,000, and an investment in waterworks of over \$17,600,000, obtain their domestic supply from this Forest. The watersheds supplying Denver, Colorado Springs, Manitou, Cascade, and Idaho Springs are given special protection against fire. At the request of local residents, Congress has added nearly 28,000 acres to the Pike Forest, while farther north, on the Colorado National Forest, Congress in 1916 authorized the addition of some 540,000 acres for the purpose of watershed protection.

Where fire has destroyed the forest cover on certain of the watersheds within the Pike, young trees are being planted. Already some 3,000 acres have been planted by the Forest Service on the watersheds denuded by the great fire of 1866, from which Colorado Springs and its suburbs obtain their water, and plans have been perfected for the reforestation of an additional 9,000 acres.

The development of hydro-electric power bids fair to constitute another important use of the streams which take their rise in the Pike National Forest. It is only in recent years that water in this region has been utilized for power, but the possibilities for development offered by the streams are tremendous.

Placer mining, which, aside from drinking and bathing, probably called for the first use of water on the Pike National Forest, is now practically a thing of the past. The use of water in the milling of ores, however, is quite common in a number of districts, and there are many

mills which could not operate without an abundant and constant supply. The value of water as a scenic, or esthetic asset, and its contribution to recreation in the



HOW THE NATIONAL FORESTS PROTECT RIVER SOURCES

- Upper Willow Creek, one of the sources of the Colorado River, in the Arapaho National Forest, Colorado. The stream comes gently from the belt of forest which stores melting snow from above timber line on the Parkview Peaks.
- Lower. Trapper's Lake, also on the headwaters of the Colorado River, in the White River National Forest, Colorado. The dense stands of timber which are characteristic of such situations help to prevent erosion and irregular run-off.

against any cutting of timber on certain watersheds.

No less important is the use of the water for domestic and municipal purposes. Denver has its main storage

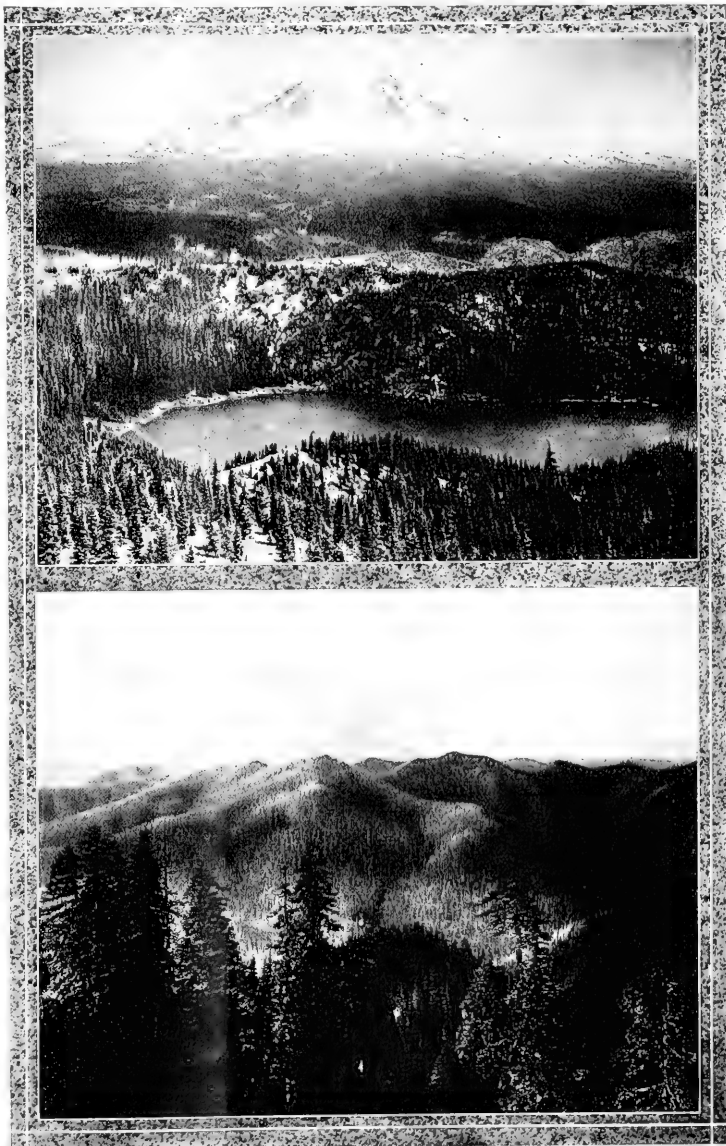
region, should also not be overlooked. To the Pikes Peake region come thousands of visitors every year, attracted by the scenery and climate. Periodically dry streams and eroded stream beds are far from attractive, and in helping to prevent erosion and to maintain a steady stream flow the forest adds materially to the value of the region for the tourist and pleasure seeker.

Some Results of Forest Destruction.

How any interference with the protective cover of trees and other vegetation works to the detriment of the water user is illustrated by the history of a small stream on the Pike Forest known as Trail Creek. This was originally a clear stream confined to a narrow channel and with comparatively little erosion. Gradually, however, the character of the stream changed as a result of heavy cutting on its watershed, prior to the creation of the National Forest and on private lands included within the Forest boundaries, followed by a number of severe forest fires. Floods became more frequent, erosion set in, the stream beds were widened, and their bottoms began to fill up with sand and gravel washed down from above.

In April, 1914, a heavy flood occurred which wrought serious damage to a small ranch at the mouth of the creek. Approximately 11 acres of irrigated land worth \$40 an acre and including nearly a fourth of the irrigated land on the ranch, were buried under from 18 to 30 inches of coarse gravel and rendered practically worthless. Furthermore the flood filled up the irrigating ditches so completely and changed the course of Trail Creek so markedly as to make it impossible to continue the use of water from the creek for irrigation without going to considerable expense in the construction of new improvements. In August of the next year a heavy hailstorm resulted in another flood which washed out several acres of hay land along the creek bottom and ruined 16 tons or more of hay worth \$14 a ton. The

same storm also brought down an immense amount of gravel in an ordinary dry gulch running through the farm and piled this 2½ feet deep against the kitchen



EVERYWHERE THE NATIONAL FORESTS AND THE MOUNTAINS COINCIDE

Upper.—Headwaters of Lewis River in the Rainier National Forest, Washington, with Council Lake in foreground and Mount Adams in background.
Lower.—Typical view of the Cascade Mountains in the Columbia National Forest, Washington, with Mount St. Helens in background.

door. Altogether, the floods of these two years damaged this one small ranch to the extent of at least \$600 and rendered approximately one-fourth of it practically non-

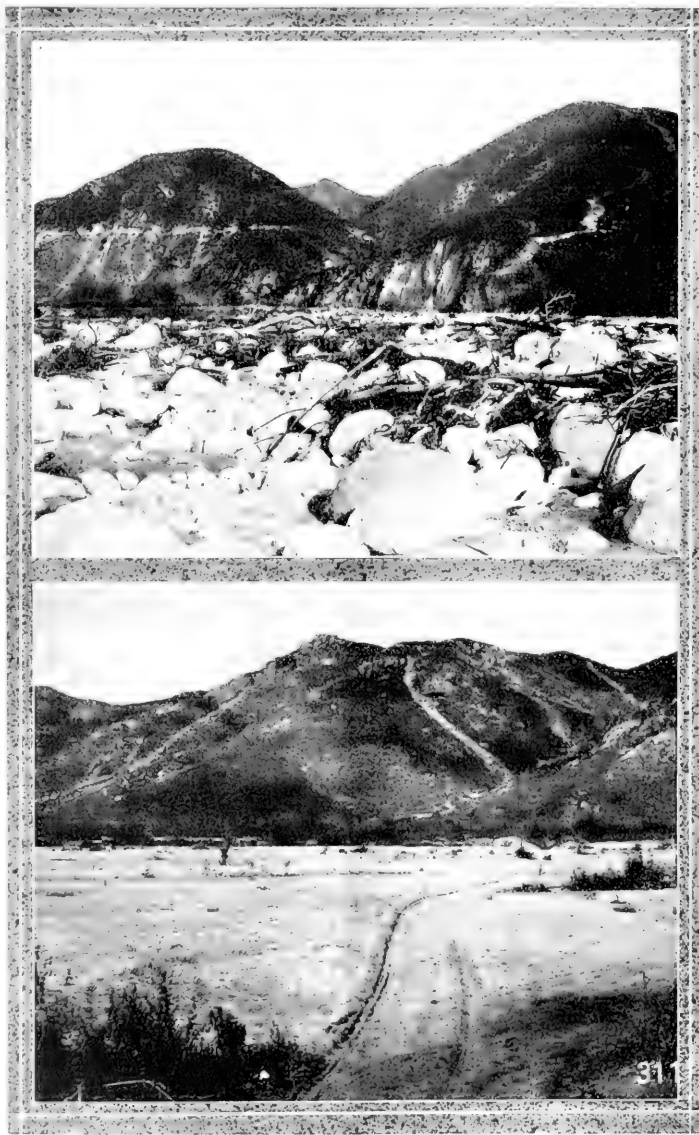
productive. Other examples of the damage resulting from interference with the forest cover before the creation of the National Forests can be selected almost at random from the Mountain Forests of the West. In the Sangre de Cristo Range and the Greenhorn Range, in what is now the San Isabel National Forest, in southern Colorado, it is very noticeable that streams whose headwaters have been denuded to a considerable extent of their protective cover have badly eroded channels and are subject to great extremes in flow, with frequent destructive floods, while no harmful effects of this sort are noticeable on streams whose headwaters are well timbered. Wild Cherry Creek, for example, after being almost completely burnt over, was subject to spring floods and to damage from erosion. During July it would dry up at a distance of not over 2 miles from the mouth of the canyon. As the watershed has become reforested these conditions have changed gradually until today the stream is not subject to floods and erosion and is more regular in its flow.

During the summer it now reaches a point 4 miles below the mouth of the canyon and is used early in the fall for irrigation. Apache Creek, which formerly flowed

the full length of its course all summer, since the destruction of the timber at its headwaters disappears only 2 or 3 miles from its head; and its only value for irrigation purposes after the middle of June lies in its flood waters, which are very uncertain. Hard-scrabble and Medano Creeks have suffered similar results, and the list might be extended almost indefinitely.

On the North Fork of the Gunnison River, in western Colorado, much flood damage has occurred as a result of the extensive fires which burned over its upper watersheds in the late seventies and early eighties. Previous to that time the creek channels were narrow and rocky, beavers were abundant, and the bottom lands showed little erosion.

In 1884 a



WHAT TOO RAPID RUN OFF CAN DO

Upper. Bomblers for soil. This view of the Santa Ana River in southern California shows how torrential run-off may wash away the soil and leave the land covered with snags, gravel, boulders, and other infertile debris.
Lower. Sand for alfalfa. The sand waste in the foreground is typical of hundreds of acres of formerly alfalfa land along the San Diego River in southern California which were seriously damaged by the flood of January, 1916.

heavy snowfall was followed by a flood which is estimated to have ruined at least 2,000 acres of good ranch land. Since then destructive floods have occurred every

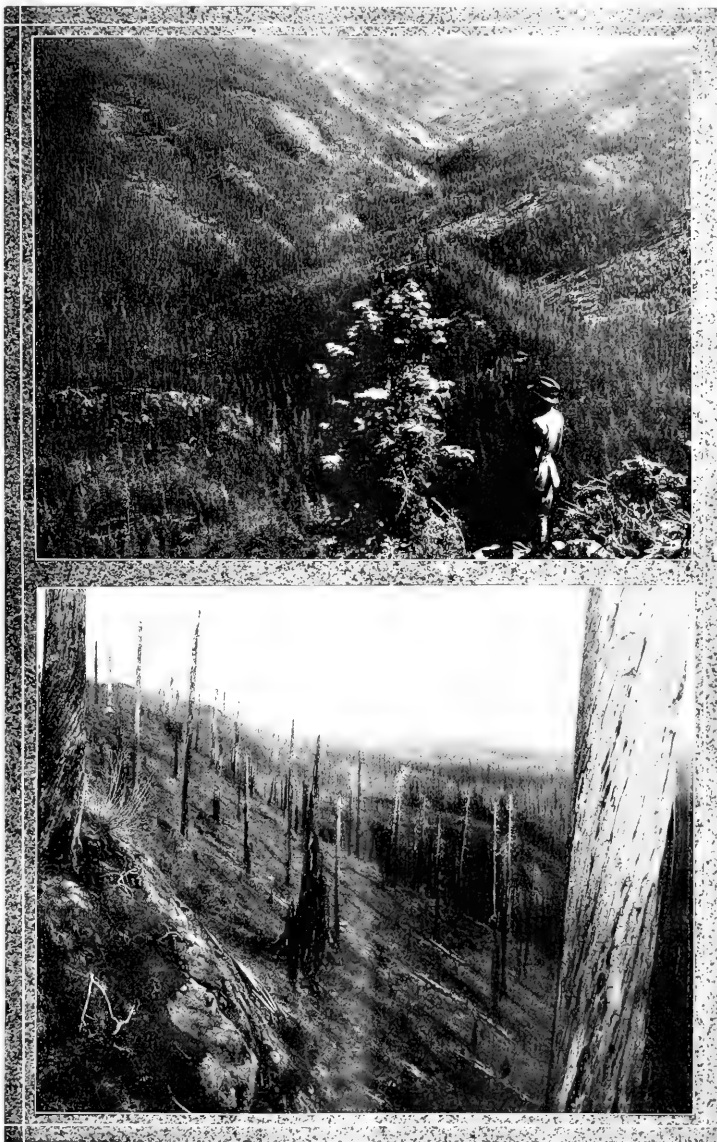
few years. In 1912 irrigated land and other property was damaged to the extent of some \$20,000, a \$5,000 bridge was washed out, and \$8,000 was expended in preventing the destruction of two other bridges. In spite of this comparatively recent damage it is generally believed that floods are becoming less frequent and less destructive as adequate fire protection on the Gunnison Forest is gradually restoring a forest cover on the burned-over areas.

Thirty years ago a big fire burned over the watershed of Gypsum Creek, which is located in central Colorado in what is now the Holy Cross National Forest. Two years after this fire the low water flow of the creek was so reduced that the use of water for irrigation from it was restricted to the first 47 decrees. Since then the flow had gradually increased with the establishment of a dense stand of timber until now it furnishes sufficient water for 130 decrees.

The following letter from a rancher in northern Wyoming throws light on what the protection afforded by the Bighorn Forest means to the water user in that part of the country: "I

have resided on Rock Creek for 28 years. During all this time I was owner of a ranch and was dependent on a good supply of water for all my crops; the welfare of my stock and my own financial standing depended, therefore, more or less, on a good flow of water in Rock Creek. All these reasons make a man observant and thoughtful about any causes that may prevent a normal flow of water in any stream the headwaters of which are in the mountains. We all know that if a forest fire runs through the biggest portion of the watershed of a stream the water supply of such a stream is greatly diminished, if not entirely cut off, during the latter part of July and August, and untold damage is done to all ranchmen who are dependent on such a burned-off area for their irrigation water.

"As proof of the foregoing, I mention the great fire on the headwaters of Rock Creek



THE FIRE MENACE

Upper.—Vista Point, on the Santa Fe National Forest, at the headwaters of the Pecos River. Dense stands of timber are typical of the higher elevations, where fire has been kept out, and form an ideal cover for the watersheds.

Lower.—View on the Rainier National Forest, Washington, along Stabler Ridge and Niggerhead. Where fires have burned we have denuded slopes like this, which are a menace to the lands below because of the danger of erosion and floods.

in 1890, when four-fifths of the Rock Creek watershed was burned off. There was good reason to think it was incendiarism. Immediately after the fire and for eight

years afterwards there was very little water at the right time. There were some destructive floods too early in the season to do the irrigator much good. But as the hills became covered with young reproduction the flow of Rock Creek kept increasing and the floods became less destructive, and today, 20 years after the fire, Rock Creek is nearly normal again, but not quite, for the reason that in the head of the main fork the fire was so destructive that there were no seed trees left for a distance of nearly 5 miles on the south side of the creek, and consequently the reproduction is very scattering.

"In conclusion I wish to state that anyone who successfully farms a ranch in this part of Wyoming understands the great importance of keeping the forest fires out of the mountains and of maintaining a good stand of timber on the watersheds of all streams to hold the snow and help prevent the rapid run-off of the water too early in the season to be of much use to the irrigator."

Many examples of destructive floods caused by over-

grazing in the mountains prior to the creation of the National Forests are furnished by the State of Utah. In what is now the Fillmore National Forest the Chalk

Creek, Pine Creek, Meadow Creek, Fool Creek, Oak Creek, and Scipio watersheds, which supply the water for 27,000 acres of irrigated land and for the towns of Fillmore, Meadow, Oak City, and Scipio, were at one time so heavily overgrazed that the resulting floods damaged roads, reservoirs, cultivated land, and other property to the extent of thousands of dollars. Since the creation of the National Forest grazing on these watersheds has been prohibited or restricted, and the vegetative cover has had a chance to re-establish itself. As a result, the floods have been steadily decreasing, both in number and severity, until they are now practically negligible. The importance of the protection exercised by this Forest is still further



PROTECTION OF DOMESTIC WATER SUPPLIES

Upper.—Intake of the water system for the city of Portland, Oregon. Water for the city comes from the Bull Run Watershed, entirely within and protected by the Oregon National Forest.
Center.—Lake Cheesman, in the heart of the Pike National Forest, Colorado—the main reservoir for the water supply system for the city of Denver.
Lower.—A street drinking fountain in Portland, Oregon. The purity and abundance of the water is assured by the fact that it comes directly from the Oregon National Forest.

emphasized by the fact that, together with the Fishlake and Sevier National Forests, it is the source of water used in the irrigation of some 200,000 acres, valued at

over \$18,000,000, and as the domestic supply for some 28 towns, with a total population of about 13,000. *How National Forest Administration Benefits the Water User.*

In the actual management of the National Forests every precaution is taken to see that the interests of the water user are fully protected. No utilization of their various resources is permitted unless a negative answer can be given to the question, Will the proposed use have any injurious effect on the water supply?

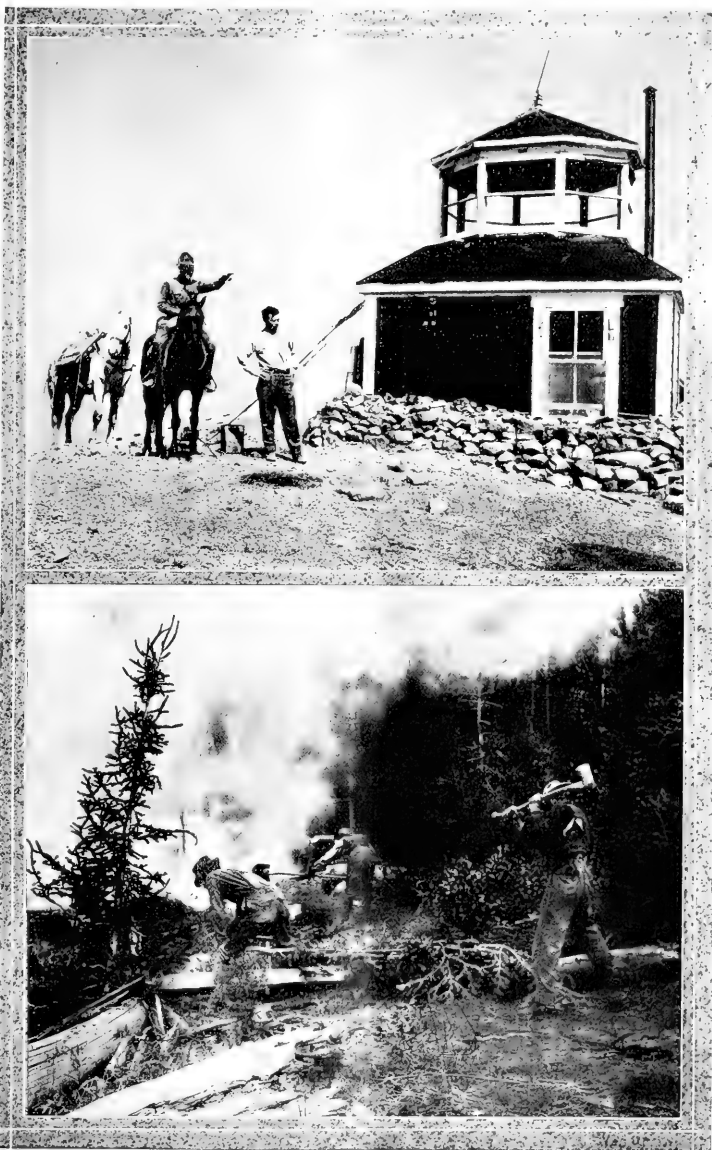
An outstanding feature of National Forest administration is the emphasis placed on fire protection. Fire is the worst thing that can happen in a forest, both as regards destruction of property and interference with the water supply. Every fire, no matter how small, destroys some of the organic material in the surface layers of the soil, and to that extent reduces its absorptive capacity. Repeated fires on the same area, even if they do not destroy the forest outright, may practically nullify its effects in preventing erosion and regulating stream flow. Every effort is made

to control so dangerous a menace. The guiding idea is to prevent fires from starting and to put out those that do start before they attain any considerable headway.

Various means are used to bring home to the general public the seriousness of the fire danger and to secure the co-operation both of local residents and transient visitors. Lookout stations are established on mountain tops and at other points of vantage for the prompt detection of fires. These are supplemented by riding patrols. Boxes of fire-fighting tools are placed at strategic points. Roads, trails, and telephone lines are built as means of quick communication. Extra men to serve as fire guards are appointed during the danger season, and the local community is so organized as to make an efficient fire-fighting force available on short notice.

The system has now reached a stage of efficiency where the majority of fires are

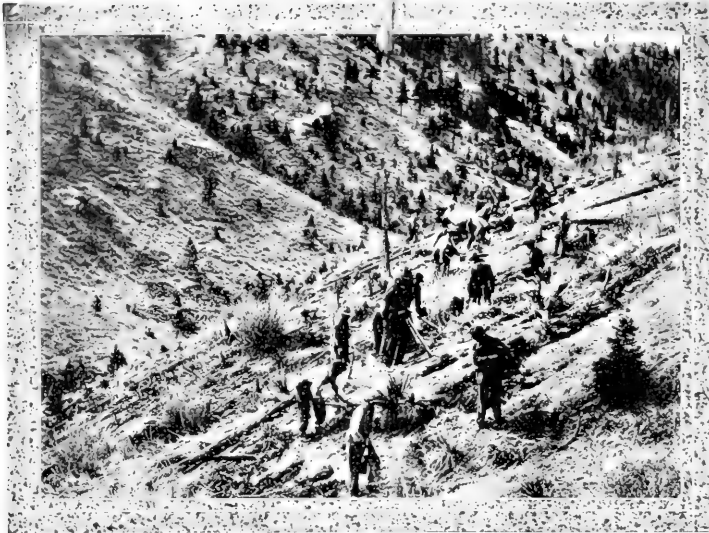
brought under control before they do any serious damage. In 1916, for example, 73 per cent of the 5,655 fires on the National Forests were extinguished before they had



FIRE PROTECTION ON THE NATIONAL FORESTS

Upper.—A fire-lookout station on the summit of Mount Eddy, on the Shasta National Forest, California. Lookout stations of this sort make possible the prompt detection of forest fires. They are connected by telephone with the headquarters of the Forest Supervisor, who is thus enabled to organize and dispatch a fire-fighting crew before the fire gains any considerable headway.

Lower.—Extinguishing a fire on the Wasatch National Forest, Utah. In the mountains of the West axes and shovels play a much more important part than water in the suppression of forest fires.



PLANTING TREES ON DENUED LANDS

Transplant beds at the Cottonwood Nursery on the Wasatch National Forest in Utah. About 10,000,000 forest tree seedlings and transplants are grown by the Forest Service each year for use in the reforestation of denuded lands on the National Forests.

burned over 10 acres, and only 4.4 per cent caused a damage of more than \$100. The chief opportunities for further progress lie in reducing the number of fires that occur, and in this work every citizen can help. The water user in particular should be among the very first to cooperate in keeping down fires. His prosperity is intimately bound up with their suppression.

Necessary precautions are likewise taken to keep in check insects and diseases which would endanger the forest cover on watersheds in the National Forests.

When the boundaries of the National Forests were first drawn it was inevitable that occasional areas of land more suitable for farming than for timber production or watershed protection should have been included. To make certain that all of the lands within the National Forests will be put to their best use thorough surveys were made by experts, as a result of which the lands have been classified according to their primary value for timber production, watershed protection, agriculture, and the like. In making this classification, one fundamental prin-

ciple was followed, namely, that land chiefly valuable for the prevention of erosion or the regulation of stream flow should be retained in the National Forests and administered primarily for these purposes. Such other lands as appear to be more valuable for crop production have either been eliminated altogether from the National Forests or else opened to entry under the Forest Homestead Act. It sometimes happened that areas were encountered which were of value both for farming and for watershed protection. When this was the case it became necessary to determine their relative value for the two purposes. The fact that throughout the West water is such a precious commodity ordinarily led to the classification of such tracts as primarily valuable for watershed protection. A good example of the way in



TREE PLANTING ON THE PIKE NATIONAL FOREST, COLORADO

This is the watershed from which Colorado Springs derives its domestic water supply. About 10,000 acres are reforested each year by the Forest Service, mainly on watersheds from which towns and cities and irrigation projects derive their water supply.

which this works out in actual practice is afforded by the Angeles National Forest in southern California, which is the main source of the water supply for millions of dollars' worth of citrus groves and other irrigated lands in the valleys below. These lands, which owe their high

productiveness entirely to irrigation, are many times more valuable than the rather mediocre lands within the National Forest, even when the latter can be cultivated successfully. Consequently, all of the land within this National Forest, much of which is easily eroded, has been classified as primarily valuable for watershed protection wherever there was any danger that its cultivation might cause erosion or changes in stream flow that would result in damage to the irrigated lands below.

The same principle also applies in the case of lands primarily valuable for municipal supply or for hydroelectric projects. Out of the 12,000,000 acres of land in the Western States that have been eliminated from the National Forests or opened to entry in the last five years, practically none are primarily valuable for watershed protection. The water user and his needs have been given first consideration. Within the National Forests is a large part of the western summer stock range. Before the creation of the Forests, this range had been so badly

trampled and so heavily over-grazed that its carrying capacity had been seriously decreased, and, what was worse from the standpoint of the water user, the protec-

tive influence of the surface cover of grass, shrubs, and small trees had been largely destroyed. In many localities over-grazing had been the cause of severe erosion, disastrous floods, and reduced stream flow during the dry season.

Grazing in the National Forests has been regulated in such a way as to repair such damage to the fullest possible extent and to prevent similar damage on areas not already affected. Not only has grazing been restricted in certain localities, but new methods of handling the stock have been introduced. In the case of sheep, for example, the old method of grazing them in large, compact bodies and bringing them back night after night to the same bedding ground, which proved so in-



REGULATED GRAZING ON THE NATIONAL FORESTS

Upper.—Sheep grazing on the Santa Fe National Forest, New Mexico. Approximately 7,500,000 sheep use the National Forest range each year. Damage to the vegetative cover is prevented by limiting the number of stock to the carrying capacity of the range and by proper methods of handling, such as open herding, illustrated in the picture.

Lower.—Cattle grazing on the Santa Fe National Forest, New Mexico. Approximately 2,000,000 cattle and horses use the National Forest Range each year. Full utilization of the range is secured by the proper development of water holes and salting grounds.

jurious to both forage and soil, has been replaced by handling them in smaller, more open bands and by bedding them down wherever night overtakes them. Cattle

are prevented from congregating too much by a proper distribution of salt and the development of watering places at the higher elevations and on the less frequented parts of the range. All stock is kept off of the range until the ground is firm enough not to be cut up by trampling. Where necessary, no grazing is allowed until the grass and other herbs have had a chance to seed. By such measures as these the water user is protected, and at the same time the grazing industry is benefited. Under the improved methods the range is, in fact, being built up to a point where it can carry larger numbers of stock than before and still afford protection from the twin dangers of erosion and irregular stream flow.

In cutting timber on the National Forests, similar precautions are taken to see that the interests of the water user are properly protected. Destructive lumbering, which too often stripped the land and abandoned it to fire, with entire disregard not only of the future timber supply but also of the water supply, is now a

thing of the past, so far as the National Forests are concerned. In its place has been substituted a system of management which assures the preservation of the forest

cover and of its protective influence. At the higher elevations, where because of thin soil, steep slopes, and heavy precipitation the preservation of a fairly dense forest cover is particularly important, "protection forests" may be set aside in which little or no cutting is allowed. At lower elevations the amount of cutting that may safely be allowed naturally varies more or less with local conditions. In each case a careful study of the situation is made, and the timber is never thinned below the point of safety. Lumbering is carried on with the primary object of improving the forest and keeping it continuously productive. So far as possible, new growth is secured by natural reproduction from the



ONE METHOD OF STREAM CONTROL

A costly substitute for brush and forest cover. These check dams are part of a series of approximately 99 dams constructed in Haines Canyon, on the Angeles National Forest in Southern California, at a cost of some \$50,000, in order to control the floods resulting from the complete burning off of the protective brush cover.

old trees left standing. Areas burned over before the creation of the National Forests need to be planted to trees and many difficulties are encountered in this work.

TRAVELS OF AN ENGLISH CHRISTMAS TREE

BY CLARA L. WEST

IT was the day before Christmas in England—in the south of England, where the belated roses lingered here and there in the gardens, and the snow melted as soon as it fell.

The family at the Hall, an old country seat, decided that it was time to bring in the tree. Now the trees on an English estate are considered very valuable. The "lop and the crop" of the trees are used for kindling, that is; the cuttings made by the woodmen, and the small branches which fall of themselves. But to cut down a tree—that is a matter requiring the greatest consideration. So, it was quite an event to go into the woodlands, with the Lord of the Manor, who had the right to cut down, or dig up, any tree he pleased.

The Squire, the guests, the children of the whole place, even some of the house servants, went with the gardener and the woodmen in search of the Christmas tree.

It was a fit tree they wanted—not too large, nor too small. When they came to a fine strong tree, they stopped, and all made a circle around it.

"Shall you chop it down now?" asked the American, one of the guests.

"Chop it down!" exclaimed the Lord of the Manor.

"Chop it down!" echoed the gardener, in great surprise.

"Chop it down!" cried the children.

They were all thinking of it as a live greenwood tree—but the American only thought of it as a framework to be dressed as a Christmas tree.

"No—we shall dig it up," said the squire;

"Yes—dig it up"—agreed the gardener;

"Dig it up"—repeated the children.

While the American wondered what difference that would make. But, that was all the difference in the world, as you shall see, for it saved the life of the tree.

The gardener measured the earth from the trunk of the tree to the circumference of a circle around it, staking it off with bits of wood, working just as if he were going to transplant it. Then the woodmen dug it up, roots and earth, and planted it in a great tub, like a washtub, which really looked like a giant's flowerpot. After that the tree was hoisted into the cart driven out of the forest, across the park, to the house. There they placed the noble fir tree in the middle of the great entrance hall. And this was the tree's first journey into a world outside of the green-wood.

The Yule log was already in the great fireplace, ready to be lighted. Holly and mistletoe boughs garlanded the chimney-piece and the old portraits in the Hall. And on the wainscoting of the walls there were curiously carved panels, representing scenes from English history, and old customs. One of them was about the "Making of Pinnes." It represented a man

kneeling before Queen Elizabeth, with many quaint round-headed pins stuck in a cushion. The Queen looked in surprise at these wonderful things. Underneath was carved in old English letters:

"How ye makinge of pinnes was firste done in a righteous and discret manner in Gloster Citee. For ungodlie men, seekynge only their present gain, fixed ye head without steadfastnesse, and fools, of their folie, made ye point with dust of Qud (?) that left it malign unto them that were wounded withal!

"Whereupon Elizabeth, our Queen, gave right of patent unto John Tilsby, our citizen, who avouched and shewed proofs that he made espingles (pins) with truth and knowynesse."

And so, it was this John Tilsby who was kneeling before the Queen showing her his good Gloucestershire pins. But no one paid much attention to the treasures in this old house—the carvings, portraits, and the wonderful porcelain collections, because the tree was waiting to be dressed. It was a real live tree, remember, with its good roots still feeding it.

Before dark the family came with hammers and tacks, and green branches, and they covered the tub, with evergreens and holly, until not an inch of the wood could be seen. After that, the red apples and oranges were tied on, to properly weight the branches—then the gilded and silvered walnuts, and many colored shining balls, paper butterflies, gold and silver birds and fishes, bon-bons, and Christmas boxes of candies (which they call "sweets" in England), and mysterious small packages for special people, tied up in gay papers. Then much glittering tinsel thread, called "Angels Hair," and paper posies. Then they put on some little glass bells, which made a cheerful tinkling sound whenever the tree was shaken. But no popcorn, because there is none in England, and no strings of red cranberries, for the same reason. The wax tapers were then put in place, red, blue, green, yellow, white and pink. And to crown it all, at the very top, they placed a big, dazzling, gold star, with many candles around it so that its shining could be plainly seen. All the large presents for the household were placed under the tree on the earth, covered with green. It was done! How fine it looked!

There the tree stood all night long, until the dawn. Very early the chimes of the village church began to ring in the Christmas morn. On and on they rang, for there were eight bells in the parish church tower, and it took nearly two hours to ring in all the changes.

The tree heard all this!

Presently a footman brought in a red bench—and placed it on one side of the hall. Then another, and another and another. They were red-cushioned benches and looked very gay. Then the man looked at the

clock, and went away to strike a gong. After the gong stopped sounding, there was a silence—a great stillness, in the house, for a time. Then the patter, patter, patter of footsteps coming down the great stairway announced the arrival of the family and their guests. "Merry Christmas" was heard on all sides. The master of the house pulled a bell, and the procession of house servants entered, headed by the housekeeper and butler, and took their places on the red benches. The family and friends were in groups near the fireplace and in the window niches. The lesson for the day was read, and the Christmas prayer said. And the Tree, in all its glory stood in the very middle of everything. Surely it had never been in such company before. And, afterwards when, amid much merry-making, the presents were given and taken, the tree had to part with some of its fine trimmings, while the little glass bells tinkled joyfully as each package was pulled off.

But hark! There were singers just outside the door:—

"Come fill the house with song and glee
With mistletoe and holly tree
For Christmastide is here."

There they stood, the children of the estate, with their fresh young faces, all dressed in their holiday clothes, singing the Christmas carol. When they had finished, they were called into the house, and each given a Christmas box.

The tree saw wonderful things that day: the carol singers, the bell-ringers, the finely dressed guests for the great dinner, the crackling Yule log, and all the fine presents spread around the hall.

The travels of the tree went on after Christmas day, for, the next morning many of the decorations were taken off, but not the glittering tinsel, the paper roses nor the great star. The cart came to the door, and took the tree down to the village school house. What a fine ride through the frosty air! The school children were to have a treat and the tree was again dressed. This time with many bags of candy and toys. All were tied so that the children could see them and talk about them. More wax candles—and some big round cakes with a hole in them through which the string to hang them on was tied. The children had a fine feast and a magic lantern show—then they sang a carol, and marched out passing the tree, each child getting a toy and a bag of candy and a cake. So, at the end of this evening the tree stood quite bare except for the tinsel, the paper posies, and the star.

One more journey the tree was to make before it re-

turned to its home in the forest, for it was going back to be planted again, and go on growing.

This last journey was to a hospital, in the Cathedral town. Once more the cart arrived and carried off the tree; and, as it rolled down the quaint old street, some children shouted "Ha! Look at the star—there goes a Christmas tree a-riding!" Again the traveling tree had to be dressed, and this time in a room where all the people were in little white beds trying to rejoice because it was Christmastide, although many were ill and sorrowful. The star shone out in all its splendor, and the fir-tree with its new decorations, stood up straight and strong, because its roots were firmly planted, and there was earth to nourish them. Nobody was afraid that the tree would fall over—it was not possible, with such a foundation, and besides it was alive!

Even Christmas festivals come to an end, and so, one morning the tree was made ready for its last ride in the cart. Then the glittering star came off, and the tinsel, and even the paper posies.

The children of the old estate eagerly watched the country road for the return of the tree. When it entered the park, the children, indeed everyone in the house, rushed down to meet it and go with it into the woods. And one of the children said. "Let us hang one of our glass bells on the tree and then it will tinkle when the wind blows." And so they did.

The gardener and the woodmen took the tree back to the very place from which they dug it up. There was the great yawning hole, and when the woodmen knocked off the staves of the tub, the tree was planted back into its old home, ready to go on growing when its roots should strike out again into the earth.

It was a proud tree, for it was not only a fir tree, but a Christmas tree, and a traveled tree, which had seen the life of creatures outside of the greenwood. When the wind arose the little Christmas bell tinkled as if to wish good cheer to all the birds of the woodland.

The children of the old place delighted to walk in the woods for they knew several trees which, from time to time, had been their Christmas trees in the Hall. Sometimes they would stop and exclaim "Look at this date," showing the metal tag with the date of the journey of the tree out of the forest.

And all this shows that it is better to have one live tree for three festivals, than to cut down, and kill, three trees for the same purpose.

This is a true story, and happens each year in a place in Southern England.

STATE FLOWERS OF MARYLAND AND WEST VIRGINIA

THE American Forestry Association has received a letter from Mrs. T. R. Payne, of Baltimore, Maryland, in which she says: "It gives the Halten Garden Club, of Baltimore County, great pleasure to announce that Maryland has a legalized state flower, the Black Eyed Susan (*Rudbeckia-hirta*). We thank you for your assistance in the matter and hope you will add

our state to your official list." And another from Mayo Tolmon, chief engineer, who says: In an article in the *Boston Transcript* I noticed you gave the state flower of West Virginia as the Indian Paint Brush. The state flower of West Virginia is the *Rhododendron*. It was chosen by the children of the state and legalized by joint resolution of the legislature.

FOREIGN STUDENTS OF FORESTRY IN AMERICA

STUDENTS from Sweden and the Philippines, both for advanced work, and other students from China and Canada have been sent to the United States to secure training in forestry, marking an advanced step in the international application of the principles of reforestation of barren areas, and the beginning of cooperative studies along reforestation lines between various nations. This acceleration of the training of men in the great out of



FORESTRY MEN FROM FOREIGN SHORES AT SYRACUSE

Reading from left to right: F. B. Mann, Lindsay, Ontario; A. E. F. Schard, Stockholm, Sweden; H. J. MacAloney, Halifax, N. S.; Mark Y. C. Hwang, Kiukiang, China; Chia Choung Tong, Tien Tsin, China and Luis J. Reyes, Manila, Philippine Islands.

doors profession is the direct result of the war, which caused a realization of the need of the world for trees and timber. Six foreign students are registered this year at the New York State College of Forestry at Syracuse, four in undergraduate work, and two in advanced study, in addition to a larger entering class than has ever before been known in the New York institution. The foreign students come with an unusual record, particularly in two instances, where they are sent by authorization of foreign governments for advanced study. The six foreign students of the New York State College of Forestry at Syracuse are: A. E. S. Schard, Swedish Royal Forest Service, American Scandinavian Foundation exchange fellow from Stockholm, in interchange with Henry M. Meloney, of the New York College, sent to Sweden by the Foundation. Luis J. Reyes, assistant Wood expert of the Philippine Forest Service, graduate of the Insular Forest School of the University of the Philippines, and for the last six years with the Philippine Forest Service. Mark Y. C. Hwang, Kiukiang, China, member of the junior class, sent here through authorization of the Chinese government, to learn how to assist in the reforestation of China. Chia Choung Tong, Tientsin, China, a freshman here for study under the same conditions as Mr. Hwang. F. B. Mann, Lindsay, Ontario, member of the freshman class, in America to study for future practical work in the Dominion.

NATURE IN THE NUDE

THE frosts, the rains and the boisterous blasts have stripped the trees of their green robes of summer and they stand naked—but unashamed.

The leafy tent which the big maple made in your doorway last June is now but a tracery of twigs against the sky. Its delicate fret-work is for the most part as rigid and motionless as if stamped from steel, for it no longer invites the vagrant zephyrs for a romp, and even the northern gale drives through its skeletonized body with almost as little resistance as a ghost would offer.

Yet it is still beautiful. We can now study the great limbs of which there was no hint beneath its summer drapery; the huge, swelling muscles where the limb joins the trunk, the point of greatest strain. Note, too, in the case of the forest maple, the perfect balancing of weight, which is the secret of the straight, columnar bole.

Observe how the oak throws out great, brawny, horizontal branches which suddenly turn and lift skyward, with an abrupt taper, in order that the multitudinous leaves of the growing season may receive their share of sunlight. The branches of the elm, on the other hand, shoot upward first and then turn their tips outward and downward, like a waterfall. But the same end is secured.

If you learn the trees in the spring and summer, with leaf, flower and fruit as your guides, you must learn them all over again in the winter. It is a bit baffling at first, for most botanical manuals seem to assume that trees are to be studied only when in verdure. But it's all the more fun for that.

Now the only clues in your arboreal detective work are the bark, both as to texture and color; the habit of branching; the twigs, by their alternative or opposite position; the leaf scars and the shape, size and color of the buds, which some people may be surprised to learn are all finished before the first frost.

But soon you come to recognize a tree just as you do a friend—instinctively, as it were, with no cognizance of details. The contour is sufficient, and you may in time rival James Russell Lowell, who implies in one of his poems that the etching against a moonlit sky enabled him to name any New England tree.

And it is true that trees look more alike in summer than in winter. In their winter nakedness nothing is concealed; their individuality is blazoned to the discerning eye. The infinite variety of nature in accomplishing the same end is revealed.

Trees, then, become more than trees to us. They become living entities, and we begin to imbue them with the aspirations and sentiments which we ourselves cherish. We begin to understand why John Muir was charged with thinking more of a tree than of a man, and we can enter into the spirit of John Burrough's reputed retort: "Well, why shouldn't he?"—(Reprinted by courtesy of the *Chicago Evening Post*.)

A CHRISTMAS WALK WITH BIRDS AND BEASTS

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

IT WAS Molly Cottontail that started us off. Her clean-cut tracks across the yard and up the hill toward the edge of the woods invited us to follow and learn her story of the night before. There had been a light fall of snow the previous day and the night had been quiet with a bright moon inviting all of the wood folk to come out for a frolic. Every action was recorded by the tell-tale prints of their feet in the snow and all

rels and nice the front feet usually strike side by side like the hind feet. When Bunny reached the hill her pace slowed up and her tracks were much closer together. We could see where she had stopped for a moment to look around for there were two little marks of her front feet in front of those of her hind feet. She did not rest, however, for there was no mark of her body in the snow. She probably realized she was too conspicuous in the moonlight against the glistening snow to stop long, for on she went to the berry patch just over the top of the hill. Here she delayed for some time nibbling the tender shoots. Several times she had hopped away from the patch for several rods only to return again. We thought she might still be hiding somewhere in the thicket but when we counted the number of tracks going in and coming out there were as many leaving as entering, so we knew she must have gone on. A wider circle about the patch showed us a clean cut trail leading toward a brush pile at some distance and there the



THE TRAIL OF MOLLY COTTONTAIL

This record tells us that she was traveling slowly and stopped twice to look around.

previous records that ordinarily would have confused the story had been erased.

What a day for a tramp it was; cold but quiet, and the crisp air sent the blood coursing through our veins and brought the color to our cheeks. Up the hill we went following the route that Bunny had taken. She had crossed the yard at a pretty good pace; we could tell because her tracks were far apart and the prints made by her front feet were far back of those made by her hind feet. When a rabbit hops, its front feet strike first, usually one in front of the other, but the momentum of its body carries its hind feet further forward than the front ones and they strike side by side. Indeed this is true of all hopping animals whose hind legs are longer than their front legs, and it is true of other animals as well, when they gallop. With squir-



WHERE BUNNY STOPPED TO LOOK AROUND

The pair of circular marks in the center of the photograph were made by the rabbits front feet when she stopped for a moment between jumps.

trail ended. Now for the fun. The first jump on the brush pile gave no response but with the second, there was a slight crackling of the sticks in the far corner and, the same instant, a little ball of brown fur surmounted by the sauciest, fluffiest white tail went bouncing across the snow toward a not distant woodchuck hole. Here Molly Cottontail had had occasion to take refuge

before and no doubt the blessed haven was well fixed in her rabbit memory though it was now almost concealed by snow.

The woodchuck hole was on the edge of the woods and near it was an old oak that we knew to be the home of a frolicsome family of red squirrels. How busy they had been storing acorns last fall and scolding the blue jays and the redheaded woodpecker that competed with them for the fruits of the great tree, but this morning all was quiet. We were about to believe that they were not yet up when we noticed the numerous trails leading



A HUNGRY RED SQUIRREL

Squirrel tracks resemble small rabbit tracks but the front feet always strike side by side.

from the base of the tree in all directions and we knew that we were the laggards. The tracks looked something like small rabbit tracks but the marks of the front feet were always side by side no matter how fast the little animal was traveling. Most of the tracks led out from the base of the tree for a couple of rods to small holes in the snow where the squirrel had dug down for acorns and then they proceeded back to the tree again where he could eat in safety. We wondered how he could remember where each nut was when the ground was covered with snow for he never seemed to make a mistake. Every track was full of purpose, going directly to the spot where the treasures were hidden.

Not so business-like were the tracks of the little deer mouse coming from a nearby stump. Perhaps he had all his stores for the winter hidden in the roots of the stump and came out just for exercise, for though we followed his tracks all about the corner of the woods, we could not discover his particular errand. We knew it was a deer mouse that lived in the stump because of the long hops and the marks made by his long tail in the snow. Occasionally when climbing a hill he apparently held his tail up from the snow so that his tracks looked very much like his cousin's, the meadow mouse, but as soon as he

started down the other side, the long slits in the snow announced his identity. The only other long-tailed mouse that lived in the vicinity, the meadow jumping mouse, we knew was safely tucked away in a snug little nest for his winter sleep. There were other deer mice living in this woodland and all had apparently been out the night before passing and repassing each other so that their trails often made a network of tracks. Sometimes they led up to the base of a tree and did not return so we knew the little mouse had climbed the tree like a squirrel for sheer fun and finally had scrambled down a grape vine that hung from one of its branches. One deer mouse track led up to a bush containing a song sparrow's nest that had been roofed over with shreds of bark and grasses, and when we touched it, a tiny yellow-brown head with two big black eyes and two big ears popped out of a hole in the side as if to say, "Hello, who's there?" Then, terrified by the size of her callers, she leaped to the ground and disappeared under a log.

Here and there in the woodland we found shallow furrows in the snow leading into burrows that ran just beneath the surface and then out into furrows again as though the little animal that made them did not know or did not care whether he ran on the surface or burrowed



MAKING TRACKS

This shows how the tracks of the cottontail are formed: the front feet, one behind the other and both behind the larger hind feet that strike side by side.

beneath it. This we knew to be the trail of a short-tailed shrew whose tiny eyes can probably scarcely tell day from night. He is about the size of a small mouse but his fur is short and dense and gray like a mole's and his nose is very pointed. Unlike the mole, however, his front feet are not enlarged and the footprints that he leaves in the bottom of the furrow as he patters along are small and equally far apart. In spite of his small size and apparent blindness, however, he is a wicked little beast for he follows the deer mice and meadow mice into their burrows where he corners them and mercilessly kills them with his needle-like teeth. Such an appetite has he that he seems to have no difficulty in disposing of an entire mouse much larger than himself for he leaves only the



COMING AND GOING

The trail of a deer mouse in soft snow. The separate marks of front and hind feet cannot be distinguished but the mark of the long tail behind each track is clearly defined. Which way did he go?

skin turned neatly inside out. He seems equally at home in the woods and the fields and on this day we found his trails almost as frequent as the tracks of the mice, perhaps because the mice do a good deal of their running on the surface of the ground beneath the snow.

Especially is this true of the fat little meadow mice that seem to have difficulty in jumping in the soft snow and prefer to burrow through it. In places where the snow was hard, however, their tracks were plentiful enough,



HAS MANY ENEMIES

The hawks by day and the owls, cats, weasels, foxes, racoons and skunks by night combine to keep the little meadow mouse ever on the alert.



THE DEER MOUSE

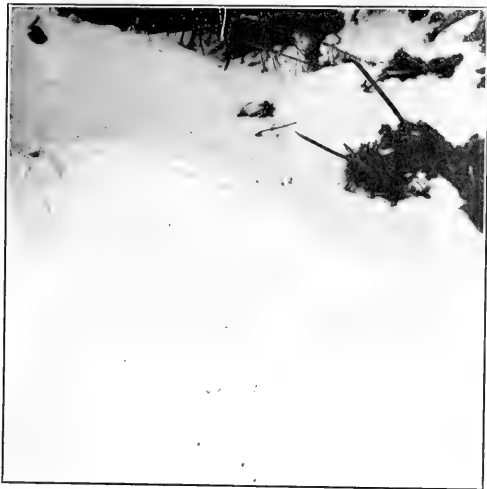
His large eyes, big ears, rich yellow-brown upper parts and snowy white underparts make him a most attractive little beast. He is also called the white-footed mouse.

looking like miniature squirrel tracks, the short tail only occasionally striking so as to leave a mark. So many enemies have the meadow mice that it is little wonder that they scarcely dare show themselves above the snow. The hawks by day, and the owls, racoons, weasels, skunks, foxes and cats by night combine to keep him ever on the alert. At this particular time, however, he had little to fear from coons or skunks, for the weather had been cold for weeks and they were snugly asleep enjoying their partial hibernation and waiting for a few warm days and nights to awaken them.

We noted, however, that the weasels were out for we followed the paired tracks of one back and forth along the edge of the woods, observing how it had loped over the surface and burrowed beneath by turns. Never a brush heap or a stone pile was passed by the inquisitive beast without a thorough exploration of all its nooks and crannies for some shivering mouselet. We knew that he was not entirely nocturnal in his explorations and as the tracks were still fresh we kept our eyes ahead for the slightest motion. During the winter the weasel's

coat is pure white except for the black tip to its tail and one has to look closely to see this or his beady black eyes and muzzle when everything is white. At last the tracks led to a pile of logs and did not lead away so we knew that he was somewhere beneath. Instead of turning over the logs to hunt for him we sat down near one end of the pile knowing that if his natural inquisitiveness did not bring him out, a few "squeaks" would. Somewhere in the distance a flock of crows were mobbing a sleepy owl and a couple of blue jays screeched their displeasure over the presence of a squirrel in their favorite tree. But close at hand all was silent save for the lispings peeps of a few chickadees hunting about the tips of the hemlock branches. We had not long to wait. A feeling gradually came over us that we were being watched and sure enough, a slight movement of something drew our atten-

tion to two shining black shoe buttons in a crevice and a tiny black muzzle which quivered slightly as though it did not like the smell that was being wafted in its direction. The animal, itself, we could scarcely distinguish from the snow all about it. When the eyes suddenly disappeared, considerable of the snow disappeared with them and we knew that we had seen more of his lordship than we realized. Not a sound did we hear in the log pile but suddenly in an entirely different place we perceived the shining eyes once more gazing intently at us. Several times he appeared and disappeared as though he were playing a little game with us, so we thought we would respond. I put my hand to my lips and gave the "young bird squeak" that is so successful in drawing birds during the nesting season. In an instant his entire attitude changed. Out popped his whole



A MEADOW MOUSE SPEEDWAY

When he ventures into the open, the meadow mouse is exposed to many enemies and must put on the high gears. He lost no time in crossing and recrossing this open stretch.

serpent-like head and shoulders, his head turning first one way and then the other and his little muzzle sniffing the air to detect the whereabouts of the breakfast that his ears had just heard. Back into the logs he went and then out of another crack much nearer. He was all attention and his little muscles seemed to quiver with excitement but his offended nostrils told him that there was nothing near but his huge and dreaded enemies, and, after a few more passes, he disappeared.

Our path now led us to the creek which was frozen over except in the swiftest places. Out from one of these led some broad pigeon-toed tracks with an uninterrupted clean cut furrow following between them that we knew could have been made by none other than "Major Muskrat." Where the snow was a little deeper his body made a broad furrow and always his heavy flattened tail cut down into the crust behind him. He apparently was not bent on feeding for his tracks merely lead to the next hole in the ice and cloudy water streaming from a hole



THE BURROWS OF THE SHORT-TAILED SHREW

His minute eyes seem barely to distinguish light from dark and he furrows the surface or burrows beneath without seeming to know the difference.

in the bank told that he had not disappeared very long before and was still inside his burrow. Down in the marsh his brothers had built a nice warm house like a beaver's, but this creek-dwelling muskrat had to be satisfied with a hole in the bank.

Crossing a stubble field we could see where a flock of



"THOUGH SHE BE BUT LITTLE, SHE IS FIERCE"

The weasel is a blood-thirsty little beast and is never more vicious than when caught in a trap. In the north, its fur is white in winter and the best grades are known as "ermine." In the summer its fur is reddish brown.

crows had held a breakfast party, digging down for the corn cobs which they had stripped of nearly every kernel earlier in the season. A delicate tracery on the snow beneath a patch of ragweed showed where some small birds had been feeding and the position of the tracks one

course to a patch of deadly nightshade whose red berries with their belladonna held no fears for him, for we could see where he had jumped after some of the berries that were just out of reach. He apparently had had a good meal, for his tracks then led off into a tangle of sedges where he jumped up almost from under our feet and got away with a great crackling and whistling of wings.

Nearly every sheltered spot held some surprise for us that morning for the happenings of the previous night were plainly written in the snow diary. It mattered not that we had actually seen only a few of the little creatures for we could easily imagine them present and could reconstruct their lives from the records which



A PHEASANT PASSED

The front toes are set at a wide angle and the imprint of the hind toe is a mere dot. The tracks are clean cut and the toes do not drag

behind the other and the marks of a long hind toenail proclaimed that a flock of horned larks had paused to feed there.

Along the edge of the field a row of large angular tracks announced that a much larger bird had gone by. The three front toes were set at a wide angle and the imprint of the hind toe was a mere dot. The tracks were clean cut and the toes did not drag so we knew that a pheasant had passed that way. We followed his trail through a clump of weeds and then down a little gully through some burdocks where he had apparently stopped for a few moments to feed. Then he continued his



THE HOME OF THE MUSKRAT IN THE MARSH

Along the creek the muskrats live in burrows but where material is available they build these beaver-like houses.

they had left. We had seen only a few birds and only three animals but we returned home with the feeling that the woods and fields were teeming with life and that after all a walk at Christmas time could be just as full of interest as one at any other season of the year.

THE ANNUAL MEETING

The annual meeting of the American Forestry Association will be held at 2 P. M., Tuesday, January 13, 1920, in the Assembly Room of the Merchants' Association, Woolworth Building, 233 Broadway, New York City.

There will be no forestry program. The meeting will be confined to business matters and the election of officers.

Later in the year the directors will decide upon the advisability of holding a national forestry conference for the discussion of forestry problems.

AIRPLANE FOREST FIRE PATROL IN CALIFORNIA

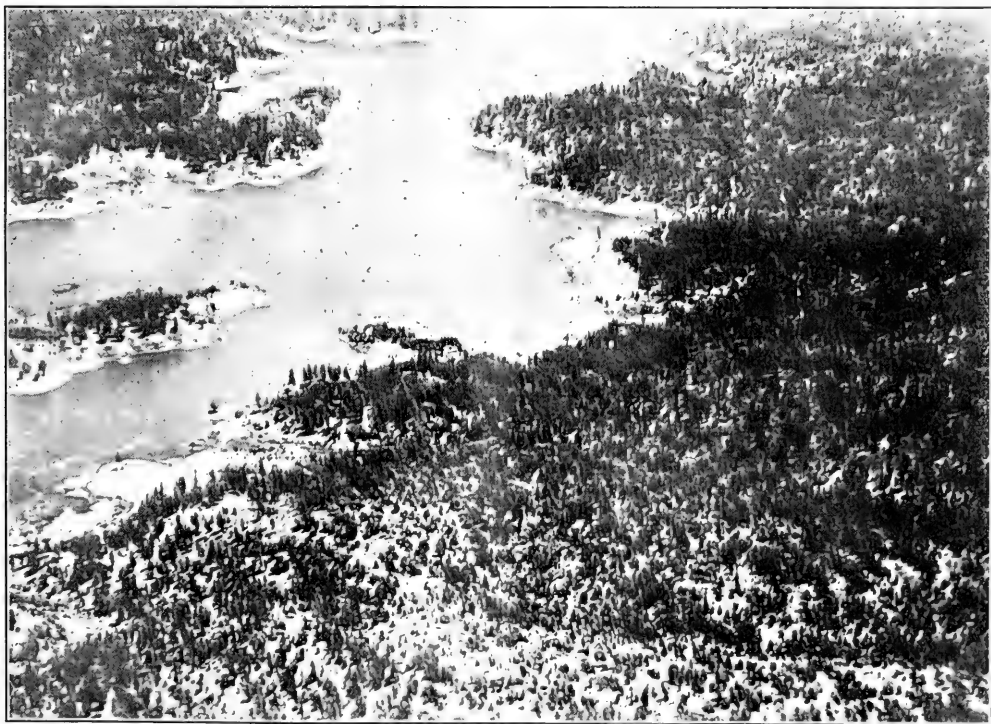
BY R. F. HAMMATT

THE first organized and sustained airplane forest fire patrol ever attempted in the United States (or elsewhere, so far as is now known) was inaugurated on June 1, 1919, in California. The work was undertaken at the request of the Federal Forest Service. It was performed—and is still being performed—by the Air Service Branch of the War Department, with Air Service personnel and equipment, and at Air Service expense. Its aim, in addition to providing the training, practice and experience which must be given the personnel, was to see how efficiently forest fires might be (a) discovered, (b) located, and (c) reported to the Forest Service organization. Six patrol routes, covering National Forest areas of high values, were laid out, and twice each day six Curtis J. N. D. planes covered the better part of some six million acres of rough, mountainous, heavily timbered country. The average non-stop run was 160 miles—the average round trip, 320 miles.

For the months of June, July, and August uninter-

rupted daily service was continued. A total of 745 flights covered 92,605 miles, and discovered, located and reported a total of 118 fires—23 of them being both discovered and reported in advance of the regular Forest Service detection organization, which was still on the job. The only reason, apparently, why more fires were not reported *first* by the air patrol was because neither ships nor ground stations were equipped with wireless. But before discussing this matter, as well as other valuable services rendered by the Air Patrol, let me give you, rather roughly, some of the conditions surrounding the work, and a little idea of the extension and reorganization of the patrol during the month of August.

Landing fields at the end of each patrol were provided, in each case, by the city or town authorities or by some local boost organization. To be satisfactory, such fields had to be level or with a constant grade not over three per cent, smooth enough that a Ford could be run over them at 25 miles an hour, 2,000 feet long, and 600 to 800



Photograph from Western Newspaper Union

HOW UNCLE SAM FIGHTS FOREST FIRES FROM THE AIR

How the forest looks from the air. This is what the observer continually sees until suddenly he spies the dreaded puff of smoke. He immediately uses his wireless and flashes the alarm to put the machinery of forest fire control into action.

feet wide. They must, too, be free of obstructions, such as telephone poles, wires, trees, etc. Facilities for gas, oil, and water must be on the field itself. Automobiles to transport pilots and mechanics from field to town were furnished by local authorities. Guards, to watch the planes while the aviators were at lunch, were provided by the Forest Service. Telephone communication with the field was also supplied. Meals while away from headquarters were provided by the State Forester. Special flying maps were prepared and furnished to the aviators, and lookout stations on the patrol routes were numbered, both on the map and on the ground, and were designated as control points to report daily on the movement of the planes. Certain members of the Forest Service were designed to act as liaison officers, and were stationed at the flying bases. Emergency landings were to be reported by the regular lookouts, and necessary arrangements made to succor and transport the pilot, guard the plane, and guide and assist the wrecking crew. Prompt transmission of the pilots' reports was provided for, as was also a daily return report so all pilots might check their fire locations with the actual location as determined on the ground. The pilots picked, visited and mapped emergency landing fields on or near the patrol routes; reported, on request, upon the condition or progress of large fires, used (with indifferent success except from the standpoint of publicity) parachutes to drop fire messages over towns in Southern California, and experimented with carrier pigeons. Forest officers were frequently taken on the patrols, and a solid and mutual understanding of each others aims and problems was thus obtained.

On August 15, with the opening of the hunting season, the fire situation in Northern California became critical. Extension of the Air Patrol was asked, and as quickly granted. This extension and other matters, required a reorganization of the whole Air Patrol in California.

De Haviland planes—equipped with Liberty motors, and carrying 96 gallons of fuel, were substituted for the slower planes carrying much less gas and having less climbing power. Two new bases—equipped with temporary hangars—one at Red Bluff and one at Fresno—were established. New daily routes were laid out, one of which, with only two landings, covers 560 miles, and the service was extended from the original 5 to 15 National Forests in the State. Two Forests situated on the east side of the Sierras, with but little fire danger, were omitted.

Beginning September 1, eight ships are covering twice each day some 16 million acres of National Forests, and, incidentally, some four or five million acres of privately owned timber lands. Eight additional ships are used on alternate days, to allow for necessary repairs, etc., and as relief for the pilots. Sixteen pilots and 22 mechanics are assigned to the work.

To date (considering now the season as a whole) only six forced landings, with one fatality (which occurred in Southern California during a heavy fog on June 1) and no injuries to pilot or observer are of record. The damage to planes, considering the number of miles

covered, and the extremely rough country patrolled, is negligible.

No figures as to cost—either initial cost of equipment or training, cost of operation or of maintenance, are available except for such general figures that no attempt will be made to quote them. And in this connection it should be borne in mind that the factor of cost, insofar as the comments, opinions and conclusions here presented are concerned, is disregarded entirely.

Having disposed thus easily of what is probably the most vital factor in airplane forest fire patrol to all owners—including the Federal Government—of timberlands, I shall proceed with various comments, observations and opinions. They will, I hope, provoke thought and comment both from the different agencies directly interested in forest fire protection and from members of the Air Service who have, this past season, engaged so earnestly and enthusiastically in this work.

Three months' trial with airplane forest fire patrol has demonstrated that discovery of fires is right around 85 per cent efficient and can be made practically 100 per cent efficient, either by providing for a longer period of time in the air or, possibly, by better correlation between the time of flight and the times of day (as shown by analysis of fire reports) when the biggest percentage of fires start.

The effective discovery radius, if we may call it that, varies with atmospheric conditions and the altitude of the ship; but may be placed, with an altitude of 5,000 feet above the country patrolled, at not less than 30 miles. I have personally discovered new and unexpected donkey engine smokes in the McCloud country at a distance of 30 miles, and after watching, recognized them as donkey smokes.

Theoretically, accuracy of location should depend at least in part on knowledge of the country, ability to read topography, both actual and as it appears on the map, and on the map itself. Factors other than these also enter into the matter. From a layman's point of view, accurate location of fires seems, perhaps, the most difficult problem (next to actually handling the ship) of the air patrol. Actually wonderful results have been obtained by pilots entirely new to the country and equipped with mighty poor maps. I enumerate only one—Lieut. E. C. Kiel, flying a De Haviland for the first time in two months, over an entirely new route, and equipped with a G. L. O. base map, on scale of 1 inch to 12 miles, placed within ½ mile of its actual location a 200 acre fire that was 35 miles away from his ship, and to see which he had to look almost directly into the sun. Other examples can be cited. Mr. F. A. Elliott doubtless has many at his command.

The reporting of the fires must, on the whole be classed as unsatisfactory. Parachutes with messages attached are too uncertain. Carrier pigeons released from the air, and report by phone or telegraph after landing are too slow to insure the best results. And yet, in this connection, it must be remembered that the slowness is comparative, and that comparison is made with a system of lookouts and specially built telephone

lines that have taken twelve years to install, develop, and perfect.

Wireless, either telephone or telegraph (preferably the former) should offer the solution to this, the biggest single drawback to airplane fire patrol as it has been conducted this past season. It is my understanding that sufficient equipment, both for the ships and for ground stations, is on hand within the War Department. Without wireless, or some other method of greatly hastening the report time, the airplane can never function as efficiently as does our present day lookout system; with it, provided it can be made to work satisfactorily and with a long enough radius, it seems possible that the lookout system can be improved upon and supplanted.

It has been found entirely practicable to get quicker, more complete, and more satisfactory progress reports, either on a series of small and widely scattered fires or on large conflagrations, by means of the airplane than by any other method so far tried. An observer who has had "the run of" the fires, so to speak, can size up a bunch of small fires pretty accurately from the air and, similarly he can, particularly if he be acquainted with fires and fire-fighting, determine very accurately the actions of a large fire. The airplane patrol in California has done very real service, the past season, both in making progress reports on large fires which were out of communication except by messenger, and in providing a quick, easy way for supervising officers to get an accurate knowledge of fire conditions within the territory under their control.

It is hard to over-estimate the value of the airplane as an educational factor. It is a matter which naturally lends itself to publicity in the daily press. The planes themselves attract attention. The Air Service personnel has interested itself keenly in the work, and has taken numerous opportunities before local gatherings and elsewhere to preach the gospel of fire prevention. In fact, I am inclined to believe that, considering the season just passed, we might disregard entirely the many positive results which air patrol has accomplished and still figure that the use of planes has been a huge success.

It seems possible, too, that the use of planes on patrol may have had positive results in the way of *fire prevention*. One valley on the Cleveland Forest, in Southern California, has, until this year, been a seething cauldron of fire. Ships have been flying over it twice each day since June 1, and the inhabitants understand that each ship is equipped with a powerful telescope and a machine gun. The valley has had no fires since the air patrol has been in operation. It is a fact, too, that the serious outbreak of fires in Northern California during August stopped almost immediately the airplane patrol started. The more probable explanation in this case, however, is that three arrests on federal warrants, and seven under the State law (following some of the prettiest sleuth work and third degree stuff ever witnessed) acted as the real deterrent.

And now, what about the future?

California is looking forward, first, to an airplane patrol conference which will be held early this fall be-

tween the Western Department of the Air Service, the Forest Service, and lumber and fire protection interests. A conference which will decide on the number and kind of ships to be used, the routes to be covered, where wireless ground sets shall be placed; in fact, a conference to line out the whole airplane patrol 1920 program, and to decide upon all preliminaries so that everything can be ready before the season opens.

California is looking forward in 1920 to 20 ships, stationed preferably at some four or five Supervisors' headquarters, where they will be in close and constant touch with the Forest Service organization and facilities. If such stations or home fields are not possible, then a forest officer will be detailed to each base selected.

We hope each ship will be equipped with wireless, and that sufficient wireless ground stations may be installed so that no ship will be out of communication more than 10 or 15 minutes. And speaking of wireless, we hope to have portable wireless receiving sets, so that, in case of a bad fire, we may try directing the fire fight (by an experienced forest officer) from the air. We believe the general fight, and we know that the progress of the fire, can best be directed or watched from above the timber and the brush rather than from below it.

We want to try Forest Service observers as well as Air Service observers. There is talk of depending on air patrol entirely, at least early and late.

We have, as you will gather, already asked for continuous daily airplane patrol of all the National Forests in the State, and let me add that, if District Forest, State and County lines are forgotten, the problem, from the standpoint of the Air Service will, I believe, be considerably simplified. We hope to amplify the progress report work and to—but why go on with all our hopes? Whatever we do, we are going to have carefully thought out and collected statistics, so as to be able to prove definitely many of the points about the work which are not now capable of absolute proof.

And now just another word. Is airplane forest fire patrol a cure-all, a panacea, a remedy for all the ills to which the forest is heir? By no means. Will it make any saving in man power? It certainly has possibilities along this line—good possibilities—and it behooves everybody, during these times, to watch and to foster all measures offering such possibilities. Is it financially feasible? If it requires an investment in equipment and personnel on the part of any outfit not now equipped with both material and men, probably not. But the War Department has both, must keep both and must train new men and keep its personnel in practice. Airplane patrol offers an opportunity for training which can't be beaten. With such co-operation as has been secured this past year, yes, it is financially feasible.

Is it a mechanical success? Yes. Refinements only in detection and location are necessary. Better methods of reporting so that the element of time may be reduced, are necessary before it may approach ultimate efficiency, but those methods should not be hard of solution.

And the thing that has made it a success has been the indomitable spirit—the youth, the eagerness and the ambition of the men of the Air Service. They are intensely interested in fire patrol and in performing a real service. They are a fine bunch of men—men whom we should feel proud to have associated with us in the Forest Service and the Western Forestry and Conservation Association. All honor to them, and if, as is often claimed, a separate Air Service will help to hold together and develop aviation and the aviator's spirit of loyalty, ambition and service, let us hope the separate Air Service soon becomes a reality.

THE MEETING OF NEW AND OLD WORLD LOGGING METHODS IN THE FIR FORESTS OF FRANCE

BY LIEUT. W. C. LOWDERMILK, 20TH ENGINEERS

THE work of the 20th Engineers in France has already been well described in AMERICAN FORESTRY. It is intended, however, in this paper to set forth some of the things of interest to an American forester encountered in the fir forests of eastern France during the progress of lumbering operations. Large cessions were made to the American Army in the fir forests of the Besancon District, in northeastern France. Eleven American operations were set up in different tracts in this region and cut an aggregate of 45 million board feet of timber, aside from quantities of piling, telephone poles, camouflage stakes, wire entanglement pickets and fuel



THE AMERICAN METHOD OF LOADING

wood, up to the time of the armistice. These operations extended from La Cluse, in the department of Ain, to a point not far south of Montbeliard, in the department of Doubs. Several more operations were in the process of development in still other timber tracts on November 11, 1918.

In this region, especially in the eastern halves of the departments of Doubs and Jura, are found probably the finest stands of silver fir (*Abies pectinata*) and Norway spruce (*Picea excelsa*) in France and even in Europe. These forests are on a par with the Black Forests of Germany, where the silver fir attains excellent development.

The forest stands are composed for the most part of silver fir, with some Norway spruce, the proportion of the latter increasing on the higher altitudes. Beech occurs only as scattered trees or small groups. The silver fir attains large dimensions, up to 125 feet in height, yielding 7 to 7½ sixteen-foot logs per tree, and up to

diameters of five feet breast high. Trees scaling 5,000 board feet were often cut by the American operations. The spruce does not attain such large diameters but its yield per unit of area is about equal to that of the fir.

The stocking is uniformly dense. On two of the largest forests of the region, namely, the forest of the Joux, in which Canadian operations were located, and the forest of Levier, the average stand per hectare at the lash caliper was for the Joux, 463 cubic meters, and for Levier, 406 cubic meters. Eliminating the volume allowed for branches—the French include the volume of the entire tree in such calculations—this would make an average stand of 35 and 31 thousand board feet, log scale, per acre. There is double this volume on some areas. On some of the parcels cut over the stand ran 800 cubic meters per hectare, or from 70 to 75 thousand board feet per acre. This total volume was not marked for cutting, of course, except in one forest, where danger from wind throw was acute. On several forests, volumes up to 50



UNLOADING LOGS AT THE MILL LANDING

thousand board feet per acre were marked for cutting. A study of the percentages of trees and volume marked was made on the first cession in the forest of Levier. It was found that the percentage of trees above 60 centimeters in circumference breast high marked on the several parcels was from 23 to 25, representing 72 to 75 per cent of the volume of the stands. Such stands furnished good logging chances.

The forests of the French Jura belong, for the most part, to the state and to the communes, or communities, scattered over the region. Only a small percentage is under private ownership. Scientific forest management,

being applied by law to all state and communal forests, is operative, therefore, for most of the region.

The effects of forest management upon the economic conditions of this timbered region is a thing that strikes an American very forcibly. The exploitation of the forests is a permanent business in each locality. The forest never disappears, for roughly, only the amount of wood grown each year is cut, and it is thus a permanent source of revenue to the inhabitants of the mountain villages. The grazing lands and the forests are the two principal supports of the mountain population. The "bucherons," or wood cutters, and the "voituriers," or wagoners, have their permanent homes in the villages, and go out to work in the same forests year after year. This feature is a direct contrast to the conditions in most forested regions of America, but it foreshadows the conditions

sturdy type, with fixed ideas, and brings with him to the present many of the methods of his fathers. There is not a great probability that timber exploitation in America will follow the same lines as it has in Europe.

The annual cut of a forest having been determined upon and marked by the French forest officers, the



THE FORESTRY ENGINEERS WENT IN FOR WAR GARDENS. FRENCH WERE HIRED TO DO THE PLOWING. IT TAKES THE MAN AND HIS WIFE TO DO THE JOB

that will be brought about in the future by the stabilization of the timber industry. The French inhabitants of these timbered regions have come to feel that they have vested interests in the surrounding forests. It is no small wonder that the native "bucherons" looked with concern upon the rapid methods of logging which the Americans introduced in "their" forests. But in every case it was conceded that the American logging methods were preferable to German methods.

The French methods of logging as they have been developed under such conditions proved to be of interest to the American loggers. Of course, it is understood that these forests are under the direct care of the French Forest Service and all operations within the forests are subjected to specified requirements. But it is meant here to emphasize the status of the French lumberjack as a result of a permanent timber industry brought about by forest management. The French "lumberjack" is a



THE LEVIER MILL, SET IN THE MIDST OF A HEAVILY TIMBERED AREA

"bucheron" comes into the forest equipped with rather primitive tools. He contracts with the timber merchant to fell and bark, and to skid and haul for so much per cubic meter. The first operation is aerial limbing to prevent damage to young growth when the timber is



SKIDDING A HEAVY CUT NEAR THE SWISS BORDER

felled. For this a specialist—a sort of steeplejack—has been developed. Equipped with climbing irons, a frail safety belt and a short handled ax, he climbs the bole of the tree up to the branches and works his way up to within 6 or 10 feet of the top. And on his way down he cuts away the branches, thus cleaning the stem. The



THE CUT-OVER AREA AFTER THE AMERICAN OPERATIONS WERE FINISHED. NOTE THAT YOUNG GROWTH REMAINS, AND A NEW STAND IS ASSURED

tree thus limbed has the appearance of a slender palm. A large number of trees may be thus limbed before felling begins. Then follow the wood cutters, who cut up the fallen branches at the base of the tree into meter lengths and stack them into "steres." The small twigs are sometimes burned, or sometimes bunched for sale. After this operation the fallers fell the tree, exercising care to throw it so as to avoid bringing down any young growth. They are efficient at this operation. When the stem has fallen it is barked—being turned by means of a powerful jack, which is the "bucherons" constant companion. The tree bole is left in the woods to dry.

The aerial limbing is a dangerous occupation. It is said that a limber rarely dies a natural death. This style of limbing cost, before the war, 3 francs, and during the war, 5 francs per tree. It is a question as to whether this operation pays in the actual amount of young growth saved. The American operations demonstrated that trees with branches may be felled so as to do no great amount of damage to young growth, as shown by the accompanying photographs. And it appears from the general opinion among French foresters, with whom the writer came in contact, that this practice of aerial limbing will be discontinued in France.

After six months or so the French "voituriers" (wagoners) came into the woods equipped with wagons, drawn by oxen, jacks, poles, blocks and chains. Whenever possible the entire tree stem is skidded to the surfaced forest roads. Skidding is done by oxen, and as

many as nine yoke may be hitched to one bole. It appears that a necessary part of the "voiturier's" equipment is a vociferous voice, which echos and re-echos through the forest as he belabors the slow-moving oxen.

The method of loading the stick when it has been skidded out to the forest road is unique. One man alone can load an entire tree. The accompanying photograph indicates how it is done. After the stick is jacked up by means of the pole and chains, the wagon gear is backed under and the stick is eased down upon it. The tree stems are hauled then to the railway station or to a neighboring sawmill. At the railroad a big overhead crane, running on a track, is used to load the entire tree lengths on cars. The tree stems are cut into lengths at the sawmills. The logs are run through jig saws, which produce good lumber, but very slowly. The mill outputs vary from 2 to 10 thousand board feet per 10-hour day. Waterpower and electric power are used most generally. In the valley about Morteau (Doubs) twenty-one such mills are in continuous operation.

French logging costs for this region before the war were as follows: For limbing and felling, 1.80 to 3.0 francs per cubic meter, varying according to the difficulties of the location. Converted into American units, this gives \$1.60 to \$2.75 per thousand, log scale. In all these costs comparisons money is figured at the normal rate of exchange—5.20. Cutting and stacking branch wood cost 1.25 to 1.50 francs per stere. The hauling cost varies between 6.70 and 7.20 francs for a haul of 15 kilometers. Converted into American units it equals



NOTE THE GROUP OF REGENERATION. A PERIOD OF NEARLY THIRTY YEARS HAS ELAPSED SINCE LAST CUTTING. THE BIG TREES ARE READY FOR THE FINAL CUTTING

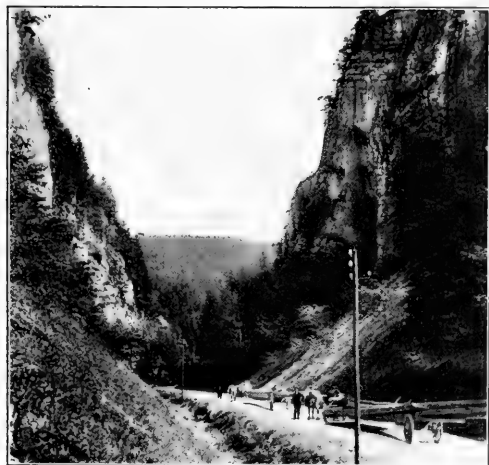
\$6.00 to \$6.30 per thousand board feet, or about 66 cents per thousand board feet per mile.

A few of the important forest management considerations may be mentioned. The system of cutting in the fir and spruce stands in the French Jura may be termed a selection shelter wood, but it is varied according to the local conditions. In a few localities an exception is made, where clear cutting is dictated by shallow soil and danger of wind throw. Natural regeneration is in all cases aimed at. The shelter trees are left when the bulk of the timber is cut to partially shade the ground, and serve at the same time as seed trees. Blackberry briars or brambles hinder the natural course of regeneration. Wherever the stand is opened up the bramble

francs, or an average of 11.93 cubic meters per hectare selling at 206.77 francs. Converted into American units this equals a net annual yield per acre of \$15.90. This is a good return from forest soil. The average price received for all grades of timber including material cut in thinnings was 17.32 francs per cubic meter; or in American units, \$15.68 per thousand board feet, log scale, on the stump. Such prices permit of intensive forest management. They were greatly increased during the war.

In the French Jura the American operations employed horse logging. Some of the stands were well suited to power logging, but the necessary equipment was not available. Horse jammers were used for loading on logging wagons. Delivery to the mill landing was done by horses, tractors and motor trucks. The excellent system of surfaced forest roads was of great assistance in the extraction of logs.

The great war has brought about many comparisons, and the introduction of a system of logging and milling



FRENCH "VOITURES" HAULING LONG STICKS TO A MILL OVER MOUNTAIN ROADS

covers the soil and chokes out the seedlings. Then follows a short cycle in which brush, such as winter berry and laburnum prepare the way for the fire and spruce seedlings. The regeneration period is, therefore, long—30 years being allowed for complete restocking. Where this will not suffice, planting is resorted to. But in some cases holes are planted up, especially where a greater percentage of spruce is desired in the stand. One small nursery for a forest of 2,000 hectares suffices for these purposes.

The annual cut or "possibility" is usually based upon an estimated growth per cent varying between 2.35 and 2.74.

The financial return from the fir forests is quite satisfactory. Taking the Levier (Doubs) forest for one example, during the period from 1905 to 1911, 32,390 cubic meters were cut per annum, selling at 560,994



A NOVEL ONE-MAN METHOD OF LOADING A TREE. EQUIPMENT USED: A POLE, TWO CHAINS, A BLOCK OF TIMBER AND A POWERFUL JACK

developed in America into the well regulated forests of the Old World, with its inherited methods, proved to be interesting and instructive to both the French and Americans. But one of the outstanding facts was that even under the pressure of war needs, forests could be exploited by American methods in accordance with the silvicultural requirements of the French, and that the regeneration of cut-over forests under such methods of exploitation may be assured.

Is There a Famous Tree In Your Town? The American Forestry Association Wants To Know About It.

A DECADE OF PRIVATE FOREST PLANTING IN PENNSYLVANIA

BY PROFESSOR J. S. ILLICK

CHIEF, BUREAU OF SILVICULTURE PENNSYLVANIA DEPARTMENT OF FORESTRY

THE planting of forest trees in Pennsylvania began in 1728 when John Bartram acquired a tract of land on the west bank of the Schuylkill River, near Philadelphia, and developed a botanical garden in which he set out many forest trees. White pine, bald cypress, Norway spruce, cucumber, and several species of the oaks were among the most notable species planted. Humphrey Marshall, a cousin of John Bartram, established a botanical garden at Marshallton in 1773 and planted many species of trees and shrubs. The garden was primarily an arboretum, and its founder may be regarded as the Father of American Dendrology.

The planting of forest trees has been practiced continuously in Pennsylvania since these early beginnings by Bartram and Marshall. At no time did it cease entirely, but it progressed slowly. Most of the planting took place in gardens, groves, and parks, on estates, and by roadsides and waterways. The real advent of tree planting for forestry purposes by private owners of woodland did not, however, take place until 1910, that is, ten years

after the Pennsylvania Department of Forestry began planting trees on the state forests, and had set out over one million seedlings and transplants. The success of the planting effort on the state forests was heralded across the state, and private owners of idle land began to inquire earnestly about the feasibility of reforesting their holdings. It soon became evident that the time was at hand for the Department to launch a co-operative scheme for the reforestation of thousand of acres of privately owned woodland within the state which were entirely unproductive, or producing only a small percentage of their full capacity. An act approved by the Governor on April 22, 1909, permitted the Department of Forestry to distribute forest tree seedlings for the replanting of woodlands within the state at the cost of production. During the first year (1910) of the working of this scheme, 66,374 small trees were distributed. Five years of co-operative effort in this direction convinced the forestry authorities that fuller co-operation on the part of the state was not only justified, but commend-



Photo by G. H. Woot

A PLANTATION OF NORWAY SPRUCE THREE YEARS AFTER THE SEEDLINGS WERE SET OUT
Trees occupy an unproductive portion of a farm. Seedlings supplied by Pennsylvania Department of Forestry.



MAKING IDLE ACRES PRODUCTIVE

A White Pine plantation four years after planting.

able. Consequently, a new act was passed and approved in 1915 which authorized the Department of Forestry to grow young forest trees and distribute them to persons desiring to plant them within the state, *the applicant paying only the cost of packing and shipping.*

The impetus which this act gave to forest tree planting by private owners of woodlands in Pennsylvania was almost phenomenal. The sub-joined tabulation shows the extent of the effort and the progress made during the past decade:

Year	Number of Trees Distributed to Private Planters.
1910	63,374
1911	25,360
1912	66,854
1913	47,770
1914	108,685
1915	115,577
1916	1,471,875
1917	1,812,097
1918	2,186,809
1919 (spring)	3,047,485
Total	8,946,876

The principal species of trees set out by the private planters are:

Conifers	Hardwoods
White Pine	White Ash
Norway Spruce	Red Oak
European Larch	Sugar Maple
Red Pine	Black Walnut
Scotch Pine	Honey Locust
Pitch Pine	Wild Black Cherry
	American Elm
	Willow (cuttings)

The planting of forest trees by private owners of woodland is now not only an established practice in Pennsylvania, but is annually extending its scope and

significance. The aggregate extent of the planting effort during the past decade is approximately equal to planting of one tree for each inhabitant of the state. The future promises a still greater development of this commendable effort, for the progressive tendency of the movement is indicated by the fact that more trees were planted during the past spring than during the first seven years of the undertaking (1910-1916, inclusive). Furthermore, more than 34 per cent of the total number of trees planted during the past decade were set out in the spring of 1919. The number of applicants has increased from 23 in 1910 to 769 in the spring of 1919, and the goal of the planting program for the spring of 1920 is 1,000 private planters.

The average number of trees distributed per applicant in the spring of 1919 was 3,963, indicating that the average applicant reforested approximately 2 to 3 acres. The applicants setting out the largest number of trees during the spring of 1919 were the Scranton Gas and Water Company which planted 164,500 trees, and the Spring Brook Water Supply Company which planted 135,000 trees. Water



Photo by W. Gard Conklin

PLANTING A WHITE PINE SEEDLING

The planting operation is simple, and one man should set out from 300 to 500 small trees per day.

companies have been the largest and most consistent planters. They began their planting effort in 1916, when six companies set out 153,700 trees. During the spring of 1919, 26 companies planted a total of 565,775 trees. While the planting by water companies extends back only over a period of four years, yet 44 different companies have already set out a total of 1,690,975 trees, that is over 18 per cent of the total number distributed by the Department of Forestry.

The most promising development of the past year is the interest mining companies of the state are taking in the subject of reforestation, 14 different companies having committed themselves to the policy of forest tree planting. They are experiencing great difficulty in procuring suitable mine timbers at a reasonable cost, and, having recently determined the probable duration of their operations, realize that it is possible to grow timber of usable size on their own holdings long before the products of their mines will be exhausted. The scope of the planting effort of a few of the mining companies during the spring of 1919 is shown in the following tabulation:

Pittsburgh Coal Company planted 60,000 trees; Pennsylvania Coal Company, 54,000; Colonial Collieries Com-

pany, 37,100; Westmoreland Coal Company, 19,000, and Cresson Refractories Company, 11,500.

Private individuals and corporations are not indulging in the practice of forest tree planting as a pastime, but are conscientiously attempting to make their idle acres attractive and productive, and stand ready to use the best forestry methods available in order to attain their goal. The Pennsylvania Department of Forestry surely acted aright when it inaugurated the co-operative scheme of

private planting, and the results thus far attained show that the private planters have been given ample and good direction in their untried undertaking.

The measure of success attained in the enterprise can best be estimated by quoting from the planting reports and correspondence of the tree planters. One tree planter writes that, "Of the 3,000 white pine and Norway spruce trees set out in the spring of 1918 all but 17 are alive." This represents an establishment of 99.4 per cent, and it is not surprising that he states that "more ground will be cleared this summer for planting in 1920." Another planter reports that "the 1,400 trees shipped to me were received in good condition, and planted personally by me. I handled each one myself and I am so proud of the result,



MEASURING THE HEIGHT GROWTH OF A PLANTATION OF 31,000 SCOTCH PINE TREES

The trees are eight years old and average 74 inches in height. One tree grew 52 inches in one season.



A STAND OF PLANTED WHITE PINE

The kind of timber white pine gives when planted carefully and treated properly.

that I would rather plant trees than eat." Another applicant reports that, "I have been planting from 1,000 to 1,200 trees each year, and they are doing well. I expect to continue planting until the present tract of 25 acres is full of trees, and then begin on other lands." This applicant has a real constructive planting plan based upon some of the best principles of scientific forestry. It incorporates the fundamentals of sustained yield, and there will be developed ultimately a normal gradation of age classes, which some think exists only in continental Europe. The most satisfying and promising report was received from a life long lumberman who wrote as follows: "Enclosed please find an application for 20,000 forest tree seedlings to be planted in Towanda township, Bradford County, Pennsylvania. The land which I desire to reforest is rapidly growing up to a great variety of woods, but there are open places where the timber growth is insufficient and the creation of a new forest can be assisted by planting. The land will never be lumbered again as long as it remains in the hands of the present owner. The writer has been a life long lumberman and has removed the lumber from a great many thousand acres of land in three different states, and now desires to aid in the development of forest growth and not in 'its destruction'."

The foregoing quotations from practical tree planters should not only support but strengthen our faith in forest tree planting. The accomplishments of the past are small compared with the possibilities of the future. There are many owners of woodland within the state who are able and willing to plant forest trees on their holdings, if they are informed concerning the attractive co-operative scheme of the Department of Forestry.

The cost of the trees to the applicant is exceedingly low. The following orders shipped during the spring of 1919 may serve as examples of the range of cost. An applicant received 5,000 white pine (2 years old) and 5,000 Norway spruce (2 years old). The total cost of

this shipment at the planting site was \$7.00, distributed as follows:

Packing and hauling.....	\$3.25
Express charge	2.75
Drayage to planting site.....	1.00
Total	\$7.00

Another applicant received 500 white pine (3 years old) and 500 Norway spruce (3 years old) at a total cost of 63 cents of which 35 cents were for packing and hauling and 28 cents for postage. A third applicant received 1,000 white pine (4 years old) and 1,000 red pine (3 years old) at a total cost of \$1.31, of which 65 cents were for packing and hauling and 66 cents for postage.

The conditions upon which the trees are distributed are very simple and reasonable. The applicant agrees:

1. To pay the cost of boxing, hauling, and transportation as soon as the seedlings are received.

2. To plant the trees in Pennsylvania for reforestation.

3. That the trees shall not be offered for sale, or sold.

4. That the trees shall be planted in accordance with instructions furnished by the Department of Forestry.

5. To furnish a report on the planting when requested.

6. That the planted area will be protected from trespass, fire, and grazing, so far as lies in his power.

7. That the subsequent treatment of the plantation will be in accordance with the principles of scientific forestry, information as to which will be furnished by the Department of Forestry on application, without charge.

The foregoing conditions show clearly that the real goal of the effort is not the placement of a large number of orders and the resultant distribution of millions of small trees, but rather the successful establishment of many promising stands of trees all over the state which will be developed to maturity in accordance with the principles of scientific forestry.



A FOREST TREE NURSERY AT CLEARFIELD, PENNSYLVANIA

It produces over one million seedlings and transplants annually. The trees are removed from the nursery at the age of two to five years.

OFFICES OF MARYLAND STATE BOARD OF FORESTRY DESTROYED BY FIRE.

The offices of the Maryland State Board of Forestry in McCoy Hall, Johns Hopkins University, Baltimore, were destroyed by fire on November 27. With the exception of some publications and exhibit material, which was kept in another building, everything was destroyed, including valuable records representing several years of field study and investigation, a report in manuscript form, 700 lantern slides, some 1500 photographic negatives, about 3000 photographs, a forest library of some 200 volumes, together with a nearly complete set of state publications on Forestry, and publications of the Federal Forest Service.

One of the most serious losses was that of the files containing the mailing lists and official records, which cover a period of thirteen years of State Forestry work. In some respects it is necessary to begin the work over again, although the published reports contain a record of fair accomplishment.

Since the mailing list will have to be entirely remade, it is important that those who wish to secure future publications of the Maryland State Board of Forestry, should make application to be entered on the new mailing list.

NOW FOR FOREST FIRE CONTROL

BY ALFRED GASKILL, STATE FORESTER, NEW JERSEY

IT IS time to face squarely the situation in which the country is placed with respect to forest fires, and the part that they play in the effort to satisfy the Nation's future need for lumber. The thoughtful public is more or less familiar with the havoc that is wrought by forest fires—the human lives, the towns and villages, the standing timber, the growing forests that yearly are sacrificed; it knows little of the conditions which bring about this destruction. That part of the population which lives in and near the woodlands knows so much that it is indifferent and callous. It often looks upon the fires as

that in some sections droughts must be counted upon at certain seasons; that careless hunters, thoughtless smokers, and often the farmers clearing their land, are weighty factors in the problem.

If the Federal Forest Service announces, as it recently announced, that a million dollars have been spent the past season in fighting fires on the national forests, the public accepts this fact and inquires no further. The statement that in one of the states a billion feet of timber has been destroyed is apt to be interpreted in the light of an understanding that there is plenty left. If one of



A BURNED FOREST

This photograph represents public wastefulness. The forest is unattractive and produces no lumber.

inevitable and as not always undesirable. It starts fires thoughtlessly and does little to control them. A season of comparative immunity from serious fires serves to lull the public, the press, the legislatures, and even the interests most concerned, into fancied security. The lessons of the past are forgotten until the next great fire comes.

When the situation is more carefully considered it is apt to be dismissed with an assertion that the railroads are responsible, or that the season was exceptionally dry, or that electric storms set the woods afire; in short that forest fires are inevitable. Though it is a fact that all these agencies are potent, it still is tremendously true that the railroad fires are only a part of those that start;

the smaller states encounters and subdues several hundred fires in a season, the actual menace and the loss escaped are little considered.

It is imperative that we recognize the seriousness of our position and take measures in every state to overcome the influences, whatever they be, which are causing the destruction of the timber supply upon which the next generation must depend. More than that, our present policy tends deliberately to foster the wasteful habits in which the people of America have been brought up. The sight upon every hand of vast areas given over to waste through fire is demoralizing. In many sections the demoralization goes so far that the value of agricultural

land, even of villages and towns, is depreciated. In more ways than in respect to lumber are we preparing to prove the adage, "Wilful waste makes wilful want."

In a region in which droughts provide conditions under which the forest is easily burned, or in which lightning fires may be set, it is almost self-evident that the utmost vigilance in the way of patrols, tower observers and organized crews of fire-fighters should be provided. In sections where the railroads are largely responsible regulatory measures are demanded; the railroads themselves are usually as much interested as the public.

The United States is facing a timber shortage, not because it is cutting its forests so rapidly, nor even be-

problem which involves nothing less than a complete change in the habits of a whole people, and their education to a realization of the facts of the situation. If the nation is now spending one million, or two million, or five million dollars to control forest fires, and suffering a loss of mature timber valued at five or ten times as much, with a loss in young trees that is quite indeterminable, is it not the part of wisdom to devote a portion of the annual outlay, plus a fraction of the annual loss, to a service that aims at the *prevention of all fires*, the elimination of direct loss, and the preservation of the growing forests upon which the future is dependent? Forestry will not be established in America by planting a few thou-



AN UNBURNED FOREST

This makes the most of soil and climatic advantages, is attractive and yields wealth in the form of lumber.

cause they are cut recklessly, though that is true, but principally because forest fires the country over are checking nature's effort to produce other forests for the benefit of later generations. No policy of forest extension, or forest control, can hope for success which is not founded upon a forest fire service capable of guaranteeing a negotiable interest in every growing forest. Silviculture is impracticable where the fire hazard is considerable; no logger can be expected to save his smaller trees for a future cut unless he can have an assurance that they will be preserved; forest planting is a foolish waste unless the plantation is made where the danger of burning is small.

Foresters are agreed that this problem is fundamental and vital. They realize, too, that fire control is more than a matter of law—even of enforced law. It is a

sand, or even many million, trees; it will come, in the main, through the protection, improvement and wise management of the forest areas, already stocked, which are our heritage.

No one appreciates the magnitude of the task more than those who have engaged actively in forest fire control; yet no one is more confident than they that the problem is essentially one of organization, supported by only reasonable amounts of public funds.

I appeal to the foresters and forestry interests throughout the country to take up, and press, an active campaign for forest fire control, in Congress and before every state legislature that meets during the coming winter. Details need not be discussed here. They can safely be left to the men who are entrusted with the work on behalf of the various states.

A NATIONAL FOREST POLICY

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE MATTER OF INTEREST REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—EDITOR.

NATIONAL LUMBER MANUFACTURERS RESOLVE

A RESOLUTION passed by the special committee of the National Lumber Manufacturers' Association and referring to a National Forest Policy is as follows:

Referring especially to the suggestion for a national forest policy as represented today by Colonel H. S. Graves, Chief Forester of the United States, and in response to the request of the National Lumber Manufacturers' Association, we recognize that both national and industrial welfare demand early development of an American forest policy which shall substitute for indifference or accident, an intelligent, practical, equitable and concerted program for the perpetuation of forest supplies; and in behalf of the National Lumber Manufacturers' Association we offer the facilities of the lumber industry to the end that the determination of such program may be effective and consistent with the true interests of the public.

The committee also passed the following:

Recognizing that no general regulations can properly be imposed; that most forestry problems are largely local, we recommend that each constituent organization of the National appoint a committee to consider the valuable suggestions made by Colonel Graves, to confer with their local state and Federal forestry authorities as to what steps are needful and practicable in their respective localities, and to promote the adoption by public and industry of such steps as may be mutually agreed upon.

We further recommend the continuance of a standing committee representing the National; preferably one also representative of the local committee which should assist said association and Government in all related matters requiring general consideration.

A NATIONAL FOREST POLICY

THE committee on Forest Conservation of the American Paper and Pulp Association, after a careful consideration of the need of a national forest policy and its features has recently made a report embodying its suggestions for such a policy with special reference to the pulp and paper industry.

This report says in part:

Any program looking toward the solution of the problem of a permanent timber supply must be:

(a) Adequate and practicable to produce the needed results.

(b) Just to all interests concerned.

(c) Acceptable to the majority.

We believe that to grow the bulk of the older and larger sizes of timber, public ownership of timberland—National or State—with private cutting and marketing operations is the most feasible solution of the problem. The production of large-size timber is too long an undertaking with too great hazards and too low a rate of return to attract private capital in adequate amount. The State and National Governments, whose primary concern is the welfare of all citizens and industries, can best afford to engage in the long time undertakings of timber growing at a low rate of return upon invested capital. On the other hand, the public will get much better service if the operations of transforming stumpage into merchantable, commodities and their distribution are left to the energy, initiative and ingenuity of private capital under such silvicultural regulations as will best perpetuate the supply of raw material.

We believe that there is urgent need for the speedy adoption and execution of a forest policy by the National and State Governments in co-operation to accomplish these things:

FIRST: A forest survey and land classification to determine what we can have in the way of present supplies and the areas which may properly be designated as necessary for watershed protection and as affording opportunity for future timber supply.

Second: A great enlargement and extension to all appropriate parts of the country of the public purchase of cutover lands for which ample precedent has been established in the East, by both the Federal Government and by some of the states. National Forests in the West created by the setting aside of land from the public domain now contain some 135,000,000 acres. Much of this land, however, is but poorly forested and even under a much more extensive planting policy than has yet been proposed will not be a source of any considerable timber supply for a long time to come. The best interests of the country would seem ultimately to require at least twice the present area of public forests.

THIRD: A much more vigorous and general extension of Federal co-operation with the states in fire prevention along the line of the Week's law coupled with such additional measures in the different states as will most reduce the fire hazard and afford opportunity for natural reproduction.

The states should do much more than they have yet done in the way of fire control. While the private owner may not be legally compelled to grow timber upon his land if he does not wish to do so he is under both moral and legal obligation to handle his property in such a way that it does not become a public men-

ace and the state may require him to conduct his cutting operations in such fashion as to lessen the fire danger.

FOURTH: The states through the adoption of uniformly fair forest taxation laws, the establishment of forest nurseries and the preparation of forest working plans should offer every possible encouragement to the owner who wishes to grow timber on his land. If the owner of land, which after competent examination is classified as valuable only for timber growing, still refuses to take advantage of the opportunities provided for such undertakings, the land should then be acquired by the public at a fair valuation and made a part of the system of public forests.

FIFTH: With a few notable exceptions forest planting has not yet been seriously undertaken in the United States. Very properly the most immediate concern is the protection of the timber we already have but with this, because of the time element involved, there should

be carried out, wherever sufficient fire protection can be secured, a very large program of forest planting upon the lands which have been so far denuded that there is no hope of securing another crop through natural reproduction.

Finally: While we regard all the foregoing as necessary steps in any adequate and well rounded out National forest policy, we especially urge that every effort be made to unite the professional foresters of the country, the timberland owners and the consumers of forest products upon an immediate program of greatly increased forest fire protection and much more general public acquisition of cutover lands. The first essential is to protect what we already have; the second to provide for future supply. Upon these measures the National and State Governments can and should cooperate to the fullest extent.

RESOLUTIONS FOR A NATIONAL FOREST POLICY

ADOPTING resolutions declaring for a comprehensive timber survey and land classification, for extensive reforestation of State and private areas, adequate fire protection, and a system of taxation which will encourage the owner of trees to let them grow instead of forcing him to cut his growing timber, the Forestry Conference arranged by the New York State Forestry Association between Col. Henry S. Graves, Chief of the United States Forest Service, and New York interests involved in the timber problem did more to advance the cause of forestry than any gathering ever held in New York State. For the first time all elements in the State took action for definite forward progress on agreed necessities, and eliminated from discussion all points on which there was not thorough agreement. The resolutions follow:—

This Conference of those interested in the forests and timberlands of the State of New York and of the Nation, grateful to Divine Providence for the gracious calm which has succeeded the turmoil and destruction of the conflict ended on the day of which this the first anniversary, registers the following statement of principles as the result of its deliberations, and commends them to the consideration of the people of the State and the Nation, viz:—

1. Timber Census. Whereas, the Great War just ended has shown clearly how inadequate is our knowledge of existing timber resources, and

Whereas, pending the securing of such definite knowledge any attempt to formulate a permanent timberland policy must necessarily be premature and without adequate basis.

Therefore, resolved, that this Conference favors a comprehensive timber survey and land classification under the authority of the Federal Congress and of the Legislatures of the different states.

2. Fire Protection. Whereas, the fundamental step in any timberland policy which may be adopted as a result of the aforesaid timber survey and land classification,

is increased protection to our forests from fire, insects, fungi, and other ravages, but more particularly from fire,

Therefore, resolved, that this Conference strongly endorses the policy of complete and adequate fire protection embodied in the laws of the State of New York, and urges its extension to all the forest lands of the State, at the same time commending its adoption to the Federal Government and the governments of the sister States of our Union, and we further especially urge that adequate appropriations be made for the enforcement of the Weeks Law, both as to forest protection and forest land acquisition.

3. Forest Taxation. Whereas, taxes on standing, growing timber should be collected when the timber is harvested, and not annually, as now under the general property tax, and

Whereas, this deferring of taxes would go far towards enabling the land owners to carry their forests until maturity without cutting,

Therefore, resolved, that this Conference approves the co-operative efforts of the New York State Forestry Association in this respect and urges its representatives to continue their labors of the past two years until the desired legislation is secured.

4. Reforestation. Whereas, the reforesting of non-agricultural lands, now unproductive, is most desirable, and

Whereas, the owners of such lands would be willing to dedicate them to continuous forest production, provided such a crop promised a profit at maturity, which is seldom the case to-day, and

Whereas, the State benefits through the favorable influence of such forests upon climate, and run off, through the production of timber and through other advantages ancillary thereto, which would amply repay the public for any benefits extended to the owners,

Therefore, resolved that this Conference urges the Legislature of the State to assist by such action as will

encourage private owners towards the reclamation of their waste lands, and

Furthermore, resolved, that this Conference recommends greatly increased reforestation by the State of its idle acres, both those now owned and hereafter acquired by it, and

Finally, this Conference desires to express and does hereby express its appreciation of the work of Henry S. Graves, Chief Forester of the United States Forest Service, in the promotion of forest conservation and tenders him its sincere thanks for his attendance at and his aid in the Conference.

WHY NOT A SECRETARY OF FORESTRY?

BY F. W. RANE

THE time is ripe for creating a new cabinet officer, a secretary of forestry and conservation. As long as so important and fundamental a field of world-wide economics is subordinated to other avenues, like those of Agriculture and Interior, which in themselves are almost boundless in their activities and importance, —just so long will this important field of forestry and conservation play second fiddle, and never be able to stand on its own feet and accomplish what it should.

We must conserve what natural resources we shall have and secure greater leadership in enacting fundamental laws and principles of actual practice and co-operation on the part of the national government, states, and individuals, if we are to accomplish results.

Nothing short of a clear-cut and recognized leadership on the part of our American public which could be symbolized in a President's cabinet-officer can fill the bill.

My idea would be to have it fully understood, that control and direction of natural resources would be directly under the supervision of this new cabinet official.

Forestry and conservation have had their sporadic leadership at times in such presidents as Harrison and Cleveland, when our National Forests were created, and then by Roosevelt, who greatly enlarged upon the national program, and was the father of a new forest policy and conservation.

Our natural resources are certainly worthy of the greatest leadership and recognition in their care and economic utilization that we as a people can bestow upon them.

The creation, therefore, of the cabinet office of forestry and conservation, which logically comes with it, the interests and functioning of this work throughout the nation, in my judgment mean more in our real economic development than anything we can do. The machinery and organization, to our credit, is well under way, but it needs, like many of the European countries, a seaport of its own, in order that its real development may be unhampered. It is unnecessary to point out at this time the important part that lumber and the by-products of the forest played in winning the war, and the experience should be enough to at least give wholesome recognition of its importance.

The Government now owns one-fifth of the standing timber of the nation. The expenditures of the Forest Service alone have increased from less than thirty thousand dollars in 1897 to approximately ten million dollars in 1918. The receipts, likewise, have increased from the National Forests' sales from nothing to millions during the same time. There are, likewise, many assets, such as recreation and out-of-door health-giving qualities that we are yearly growing to appreciate, which leadership will bring to light. We need a more modern forest policy. Colonel H. S. Graves, the United States Forester, is working hard and well to establish one, and so are President Charles Lathrop Pack, of the American Forestry Association, state foresters, and progressive lumbermen everywhere. Therefore, why not give the whole question the impetus that it deserves by having forestry and conservation under the direction of a government department devoted solely to this work.

What is true of forestry is equally true of conserving all our natural resources. The longer we allow our natural resources to be developed in a haphazard manner and without the very best direction and control, we are just to that extent wasting our nation's birthright, regardless of any argument to the contrary. There was never a time in the history of the world when the future of every country depended more upon the intelligent and economic development of her every natural resource than the present.

Are we going to rise to the position of a world-power, and then find as in the parable, we have built our house upon the sand instead of upon a rock. These are no idle words and this is no time to allow so important a matter to go by unheeded. There are great and powerful financial interests already developed and their usefulness and importance are of the greatest of benefit, but it inevitably follows that sooner or later there is a great need on the part of the government and the corporations, or these interests, of an understanding, in order that all may work out for the best.

The reconstructive period is here, and we can ill afford to continue wasting our birthright. Lumbermen, manufacturers, power companies, sportsmen, naturalists, statesmen, and all public-spirited, country-loving citizens, should subscribe joyously and heartily to this idea.

SLASH PINE GROWTH IN THE SOUTH

BY WILBUR R. MATTOON

EXTENSION SPECIALIST IN FORESTRY, U. S. FOREST SERVICE

MUCH has been said about the vast area of cut-over timberland in the South, its idle condition, and its potential value for farm crops, livestock, and timber. Passing over the big problem of fire protection, which should not be an insurmountable obstacle to good management with the right sort of encouragement to private owners from the Federal and State Governments, the factors that make the Southern pine belt economically attractive for investments in young or growing forests are (1) an abundance of land of low value in excess of all that can possibly be used for farming and stock raising

and South Atlantic coastal region and passing northward to Missouri, Kentucky and Virginia.

Slash pine (*Pinus caribea*), formerly called by the U. S. Forest Service "cuban" pine, occurs over the central plains from South Carolina to the Mississippi River. It is very closely associated with longleaf pine, from which it is not easily distinguished. Its home is in the poorly drained flat lands and sour soils, and in this respect it is the complimentary species of longleaf pine, which occupies the dry, sandy "ridges." These ridges, alternating in somewhat regular fashion with the flat lands,



LOGGING MATURE SLASH PINE IN THE FLAT WOODS

On account of the close similarity in the foliage, bark, and wood, mature slash and longleaf pines are not commonly distinguished and are cut and marketed as longleaf pine. The effect of repeated forest fires is seen in the damage and killing of many trees.

during the next 30 to 50 years—the life or rotation of a second-growth forest crop; (2) a very long growing season; (3) good logging and shipping facilities, and (4) relative nearness to the big eastern markets.

Four species of pines must comprise the chief agents of economic production during the next half century on a vast area of low-valued, southern cut-over land, an area consisting of the "excess" lands that cannot possibly be utilized for other crops or for livestock development. The "big four" pines are: Slash, longleaf, loblolly and shortleaf pines, mentioned in the order of their geographical predominance beginning at the extreme Gulf

make up the extensive, slightly undulating coastal plain.

In its younger stages slash pine has very generally been mistaken for loblolly pine, which it resembles in growth even more than it resembles longleaf pine in its more mature stages. This fact affords the chief explanation for the lack of general acquaintance with and general recognition of slash pine.

With the cutting of the virgin forest in this region, slash pine seems to have acquired a much larger local distribution, in much the same way as in the case of loblolly pine farther north.

Slash pine is the predominating species in the young

forest growth over considerable areas formerly occupied by longleaf pine. The region extends from southern South Carolina over the lower third of Georgia, through extreme southern Alabama and Mississippi, southeast Louisiana, and extensively over Florida. Although chiefly poorly drained, sandy flatlands, the region extends into the rolling hills of southern Georgia for a

tions. Longleaf, however, seems to be more persistent in height growth and somewhere at about 50 to 60 years of age bids fair to outstrip its rival. The average height growth up to middle life is shown by the studies thus far completed to exceed noticeably that of loblolly pine in the coastal region of the Middle Atlantic States.

The structure of the wood, shown in cross section herewith, is such as to give it very high commercial value. Even when young and fast growing, the tree produces a proportionately wide band of summer wood, very dense and resinous, and sharply demarcated from the spring wood of the same season's growth. The disk here shown - the breast high section of a 17-year old tree, 10.7 inches in diameter, is composed of 63 per cent of summer wood, a striking amount for a tree of such rapid growth.



A THREE-YEAR OLD SLASH PINE SAPLING

This made a height growth this year of about 32 inches. Longleaf pine at this age would be from 2 to 4 inches in height. Unlike longleaf, slash pine does not have a heavy tap-root and is easily and successfully transplanted.

distance of 125 miles from salt water. Localities of high, relatively dry hill land, especially a portion of Florida about Tallahassee and the Florida National Forest, form well marked exceptions in the general spread of slash pine. Because of the uneven distribution of seed trees and the occurrence of annual fires, the stand of young slash pine is by no means regular or continuous.

Recent growth studies of slash and longleaf pine, although inadequate in number, point clearly to a marked difference and superiority in favor of slash pine. For example, slash shoots up rapidly in height during the first 25 years as compared with longleaf; at 30 to 35 years on poor situations, its upward growth appears to average about the same as that of longleaf on favorable situa-



A LOUISIANA FAMILY

A slash pine mother and her children. The 13-year old stand might now be tapped for turpentine, but to let the trees grow for a few years will be good economy for the owner.

Fast-growing loblolly, in comparison, has much narrower summer wood, grading very gradually into the wider band of spring wood.

Young stands should be operated under methods which conserve their productive capacity for crude turpentine, such for example as those used by the French. In this manner they can be profitably worked from the time they

reach the age of 15 to 20 years during a period of 30 to 35 years or more. Under such management the density would be regulated for the development of medium sized trees with thrifty crowns, and necessary thinnings would be brought about by means of heavy and profitable cupping before cutting the timber product. This advantage can hardly be over-emphasized in consid-



SLASH PINE THREE AND TWELVE YEARS OLD

An abandoned field with vigorous growth of slash pine 3 years old (on the right), now 4 to 6 feet high. In an earlier 12-year old stand to the left, the trees, although over-crowded, are 3 to 5 inches in diameter at breast height and 30 to 40 feet in height. Slash pine begins bearing seed at about 12 years

ering the profitability of growing slash pine under forest management.

Sufficient measurements of growth are not available at present to forecast very broadly the financial returns on investments in land devoted to second growth slash pine stands. It can be said roughly, however, that well stocked slash pine stands 15 to 25 years old should yield a return in turpentine of \$1



A TURPENTINE OPERATION

A 13-year old slash pine stand being worked for turpentine. The X's point to "faces" the old time wasteful and ruinous "boxing" method being used. One hundred trees per acre are being turpented, bringing the owner \$10.00 per acre, and leaving 328 trees per acre for later working.

an acre for each year of its growth, and, at current stumpage prices for pulpwood in North Carolina and Louisiana, \$1 to \$1.50 per year in pulpwood, or a total of \$2 to \$2.50 yearly during the life of the stand.

A calculation by the Forest Service of the number of cords of pulpwood yielded by well stocked stands of slash pines of different ages gives a yearly production of about one cord of peeled wood per acre from stands roughly 10 to 16 years old, and $1\frac{1}{2}$ cords per acre from stands over this age up to 25 years. These are natural stands subject to annual burning and the slowing up in growth due to direct injury to the trees and loss of organic matter or humus from the soil. Under forest management this growth should be materially increased. Part of the story of growth will be found by the reader in connection with the several accompanying photographs.

In the course of the economic development in progress over the South, the South Atlantic and Gulf States have

a splendid opportunity to utilize profitably their hundreds of thousands of acres of sandy, "barren" lands by handling them for turpentine and pine timber products from second growth slash pine stands.

Slash pine possesses some striking silvicultural and economic qualities. Its high production of crude turpentine is recognized among all operators. Mr. C. F. Speh, Secretary of the Turpentine and Rosin Producers Association of New Orleans, is authority for the statement that slash pine not only produces larger quantities of crude turpentine, but also a whiter and higher grade of rosin than does longleaf pine. By official tests of the Forest Products Laboratory of the U. S. Forest Service the wood ranks as the heaviest, hardest and strongest wood of any coniferous species in the United States. The tree seeds rather freely, bearing a small, light, winged seed easily carried by the wind, is readily and successfully handled in the nursery and in forest planting, and its growth is vigorous and rapid.

TRACTS ADDED TO FORESTS

PURCHASES totaling 66,381 acres in the White Mountains, the southern Appalachians and Arkansas at an average price of \$3.91 per acre have just been approved by the National Forest Reservation Commission, a body created by Congress to purchase land on the headwaters of navigable streams for the protection of their watersheds. The action of the commission means that usefulness of the new National Forests in the East, the inception of which dates from the beginning of purchase work in 1911, will be greatly increased.

Of the above total 362,288 acres are in the White Mountains, constituting about one-half of the mountain lands which it is desirable to acquire in the White Mountains of New Hampshire and adjoining portions of Maine for the protection of the headwaters of important streams. The purchase which has been authorized in the White Mountains consists of 1,650 acres of timbered land in Oxford County, Maine, at an average price of \$9 an acre.

In the Monongahela area, Tucker County, West Virginia, 23,900 acres of cut-over land were approved for purchase at an average price of \$2.34 an acre; also the purchase of 489 acres in Hardy County, West Virginia, on the Potomac area, at an average price of \$4.34 an acre.

In Virginia a total of 14 tracts, comprising 10,630 acres, were approved for purchase, the average price being \$3.87 an acre. Of this land 8,705 acres are in Rockbridge County, 1,190 acres in Amherst County, 214 acres in Highland County and 521 acres in Augusta County.

In North Carolina, 4,416 acres in 17 tracts were approved for purchase. These are in Buncombe, Burke, Macon, McDowell and Caldwell counties, at the average price of \$8.73 per acre. The largest tract, that in Burke County, comprises 1,800 acres.

In Georgia, 52,828 acres were approved for purchase at an average price of \$6.60 an acre. This land lies in Habersham, Fannin, Union and Rabun counties, the largest tract being 4,833 acres in Union County. All of the authorized purchases are so situated as to fit in with other tracts already acquired or being acquired, the purpose being to make the publicly owned areas continuous tracts with as few privately owned intervening tracts as possible.

In Tennessee in the Cherokee area, 2,150 acres were approved for purchase in Monroe County, at a price of \$3 an acre.

In the Alabama area there were approved for purchase in Lawrence and Winston Counties, 5,950 acres, the average price an acre being \$5.04.

The approvals for purchase of land in Arkansas were made with a view to further "solidification" in the Arkansas and Ozark forests—that is, the acquiring of scattered alienated lands in the midst of tracts previously acquired. The total amounts to 9,323 acres at an average price of \$3.98 an acre. The tracts are located in Stone, Newton, Pope, Montgomery, Scott, Yell, Perry, Polk and Logan Counties, the largest tracts consisting of 920 acres in Perry County and 800 acres in Stone County of cut-over land.

THE DRY KILN AND CONSERVATION

BY E. W. TREEN, B. S. F.

DURING these days when conservation of our natural resources, particularly our forest resources, is preached right and left, it seems to the writer that not enough stress is put on the subject of conservation for the benefit of the present generation. This is not inferred as a detriment to our future generations, but as a direct aid to production for their benefit in the future.

Forest conservation seems to be mainly dependent, according to the writer's point of view, on three things, namely, reforestation; protection from external agencies, as fire, ruthless lumbering, etc., and closer utilization of our present cut. This article deals with a phase of the last of the three, a phase which is not very familiar to the public at large, the dry kiln as a phase of utilization.

The dry kiln is the only practical means we have at present of drying lumber fast enough to insure the wood-working industries a profit in the shortest possible time after the raw material is obtained. Kiln-drying is really the first step toward the finished product after the rough lumber stage is passed. The condition of the kiln output is in direct proportion to the good or bad condition of the finished product. By this is meant that if badly dried lumber starts through the processes of manufacture, all results of these processes will be damaged to the same extent.

A mere mention of a few important industries dependent on kiln-dried lumber will bear out the magnitude of the subject. First of all, is the manufacture of furniture, in which the United States holds a very high place in the world's market. Then we may mention the manufacture of flooring, auto bodies, toy production, and several other related industries. To provide for the wants of these industries, several standard dry kilns are on the market, most of which will give good results if properly handled. The Forest Products Laboratory at Madison, Wisconsin, is doing yeoman service in experimental work in the dry kiln line, but the results of these investigations do not reach nearly as many of our people as they should.

The basic principles of successful dry kiln operation have been mentioned time and again, namely, control of circulation, humidity, and temperature. It is not the writer's idea to discuss these principles again, but to mention a few different phases, which he has seen in his travels as a dry kiln engineer, trying to show that these cardinal points are more often discussed than applied.

First and foremost is the man who operates the dry kiln, the dry kiln engineer, for, if he understands his business he is an engineer in the highest sense of the word. When the Forest Service employs highly technical men in dry kiln investigation, and practically all our forestry colleges are giving courses in dry kiln engineering, it is a pretty good indication that there is more to the game than simply turning steam into a brick building, and leaving the lumber therein to work out its own salvation. As a profession dry kiln engineering offers more

opportunity for successful research, in the writer's estimation, than most of the engineering professions. Here are the prime requisites of the successful dry kiln engineer: He must know wood in all its phases, as to species, wood structure, working qualities, sensitiveness to outside agencies, as heat, moisture, etc.; he must have a thorough knowledge of thermo-dynamics, and a knowledge of how the different species are affected by the different heat agencies.

To assume we have the man suitable for the job, here is one reason why this man is not getting the success he should be getting. It is the interference of those higher up in the business. As an example may be stated the case of the dry kiln engineer at many of our large furniture factories here in Michigan. The superintendent complains to him that 6/4 red gum on being worked, shows a deal of warping and signs of checking. This gum contained thirty per cent of moisture when placed in the kiln, and the operator knows that it will take at least fifteen days to dry it effectively. But the shop foreman wants it rushed through in ten. The operator does as he is told, although he knows what the result will be, and he is blamed when the results are seen. To insure success, the operator must be absolute master of his kilns, and, within reason, should be troubled by no outside interference. If many employers would think of this a little more, many "unexplainable" dry kiln defects might be remedied. We realize that the superintendent wants his product on the market as quickly as possible, which is very easy to understand, but the effective working of the parts will insure the success of the whole.

Too often, also, a man is picked from the working force of the factory, to operate the dry kilns, a man who knows part of the process, but does not know, or does not care to know, other essential parts. The engineer is often picked to have charge of the dry kiln operation. Oh, yes, he understands his boiler capacity in fine shape, can furnish all the steam and spray required, keep his valves and piping in first class shape, but does he know the wood he is drying? Too often, no! As long as the temperature doesn't run too high, he thinks there is no cause for worry, and all the time the lumber is shrinking, warping and checking, until it comes out looking as if a tornado had been through it. This state of affairs can be remedied. If the employer doesn't want to pay the salary required by a first class operator, at least he can select a man who is interested in his job, and is willing to learn. Results have shown this is a surely wise policy.

The testing of the lumber is also too often neglected. From the writer's experience he has found that the general practice is to test the lumber for moisture content and shrinkage *after* it is supposed to be dry. At least four tests should be made to insure a perfect drying schedule, *i. e.*, just before the charge is placed in the kiln, after the steaming period, at least once during the

real drying period, and just before the kiln is to be emptied. The reasons for these tests are obvious. The first test gives an idea as to how long the lumber should be dried, the second and third tests as to whether the moisture is leaving the lumber, and the last shows whether the wood is dry enough for the intended purpose. The first test is also a safeguard to the purchaser in case he is buying kiln-dried lumber, specified to be down to a certain moisture content. If these tests are correctly made, a schedule can be built up from them, to be applied in drying future charges. Valves should be marked and steam pressure regulated, to insure as nearly perfect a schedule as possible with each charge. Schedules are issued by dry kiln manufacturers, but no two kilns will give the same results under such a prescribed schedule, due to changeable external conditions. The process of manufacture can usually be so planned to work in harmony with the proper kiln schedule. A hit-or-miss schedule is a sure indication of laxity in the operation. If records are kept of each charge and results obtained, a degree of perfection can soon be certified.

This has been a rather general discussion, but the writer has tried to give a few suggestions in kiln-drying lumber, so that less of it may go eventually to the burner, which means that less lumber will have to be used to complete the product for the market. This factor of less waste and more production will work backwards until our remaining standing timber is reached, until we come as near as we can to that goal, at which all good foresters are aiming, the saving of our timberlands.

"GUARDING FORESTS NEAR BROADWAY"

THAT there is an opportunity for forest fires within fifty-two miles of Broadway so astonishes the Editor of the Evening Sun, of New York City, that he proceeds to print a good story about the forests in the hope, no doubt, that his readers will be astonished too. The Editor of the American Forestry Magazine extends congratulations to the Editor of the Evening Sun and hopes he will find further opportunity to enlighten his readers by printing more about the condition of the forests in New York State and elsewhere. The article in the Evening Sun follows in part:

"Forests primeval, extensive wilderness resembling in every detail the enormous plains of the West—and only fifty-two miles from Broadway:

"Manhattanites who eke out their existence exploring the limits of Greater New York as far as the subway lines will permit them have never realized what a wealth of woodland, of the regular wild kind, is close to New York. There are no less than 400,000 acres of woodland, in Suffolk County, Long Island alone. So extensive are the wilds in that region that forest fires have occurred with dangerous frequency and means to combat them have been undertaken by the State conservation authorities.

"The occurrence of forest fires within such a short distance from Broadway may be a surprise to the average New Yorker, but a greater surprise is in store

for the city visitor to those regions, for he will have an opportunity to view for the first time the extensive fire protection system that has been installed there.

"The first thing that strikes the eye of the city visitor as he leaves the train at Holtsville, Long Island, is a huge forest observation station. It is located on Telescope Hill, which lies just north of Holtsville station on the main line of the Long Island Railroad.

"An expert observer, A. H. Lucas, of Selden, appointed to keep a careful watch of the surrounding woodlands during the forest fire season and to report them upon detection to the town supervisor of fire wardens, is stationed on the tower.

"The second tower is located on Flanders Hill, southwest of the town of Flanders and about seven or eight miles south of Riverhead. It is similar in construction to the Telescope Hill structure. From there one can command a view of the entire territory from the sound to the ocean. J. M. Brewster, a hardy, experienced forester, is in charge of this tower.

"The system of fire prevention on Long Island has been maintained by the Commission in the Adirondacks for many years, and its effectiveness in prompt detection of fires there has been demonstrated many times. When the Commission proposed sites for the towers last year, Long Island fish and game clubs as well as land owners subscribed liberally to provide funds for the purchase of the towers.

"Long Island is New York's playground," says William G. Howard, assistant superintendent of State Forests, who recently submitted a report of the condition of that territory to the State Conservation Commission.

"It is impossible to estimate the thousands upon thousands who go there for recreation and who have their summer homes there," Mr. Howard pointed out. "The central and eastern portions of the island are so far from the city that they are not densely populated. There are extensive areas of wild land grown up to brush and trees—unfortunately more of the former than the latter.

KEEPING THE BARK ON

FOR preventing the bark from flaking off logs used in rustic structures, the Forest Products Laboratory, Madison, recommends the following methods of seasoning and preparing the timbers as the most effectual:

(1) Cut timbers late in summer and score on two sides; that is, cut off narrow strips of bark for the entire length. Pile in shade in open pile to allow thorough circulation of air. Allow timbers to season until following spring or summer before using.

(2) Proceed as in (1), and in addition coat ends, stripped portions, and knots with coal-tar creosote, using one coat a few days after timber is cut and another just before using the timbers.

(3) Proceed as in (1), but do not score bark. When timbers are in place, tack bark on with large-headed nails, placing one to every square foot of surface. Paint heads of nails to resemble color of bark.

(4) Tack or nail the bark on without particular attention to time of cutting or other treatment.

STEADY "WAKE 'EM UP" BARRAGE

THE TRIBUNE CALLS FOR ACTION

UNDER the heading "Factories Peril Own Lives With Trees They Kill," the *Chicago Tribune* takes up the campaign of the American Forestry Association for a national forest policy. The *Tribune* bases its drive on a purely business argument and warns the industries of the Middle West in the following language:

"Approximately a fifth of the manufactories of Illinois, Indiana, and Ohio depend on wood for their running. "In from ten to twenty years, at the present rate of unregulated cutting, unattended as it is by any systematic replanting, the lumber from the South will be exhausted.

"Then the Pacific Coast will be good for forty years, but it will be too expensive for the purposes of our factories to ship timber so far. Hence the factories will either succumb or be moved into the Pacific area. In either case we shall lose them.

"In these three states of Illinois, Indiana, and Ohio there is a great deal of soil that should not be farmed, if it is, because that soil is so poor that it does not pay the farmer a fair return for extraordinary severe effort.

"Some specialists estimate this unprofitable area at one-sixth of the total area of the three states. This estimate probably is excessive.

"On many of these farms people do manage to eke out an existence, but it is a growing economic waste to have generation after generation continue the struggle.

"But trees don't need so much humus as grains and grasses do. Trees are a mineral feeding proposition. "You can grow good trees where you cannot grow good barley.

"Not dabbling in prophecy, but considering the foregoing facts, the state and county forests of Illinois, Indiana, and Ohio have formed, on the initiative of Ranson E. Kennicott, chief forester of the Cook County Forest Preserve, the Central States Forestry Association.

"The new organization hopes to hold its first meeting in Chicago next April.

"Its object is to formulate a tri-state forestry policy and urge upon the state governments the necessity of extreme measures of forestation and reforestation, and the

establishment of a system of restricted cutting that shall be in some proportion to the amount of replanting.

"The estimate of some members of the association, notably Mr. Kennicott, is that the three states could profitably put something like a seventh of their area into commercial forestry.

"The association bases its campaign on both the natural and the commercial advantages to be derived from a liberal policy of reforestation.

"First, the trees are needed to conserve moisture and prevent erosion, which is progressing in late years at an alarming rate.

"Second, the three commonwealths cannot retain their wood-using industries if they don't provide the wood for them.

"State authority and state aid in reforestation will be asked because private capital is not going to go into a proposition that looks as far forward as forty to sixty years for the richest part of the return. It's got to be the state.

"On the other hand, reasonably prompt returns are not excluded if the system of forest management be comprehensive.

"If you have absolutely to reforest bare land it will be about forty years before you can get a steady income from it.

"But from second growth and coppice areas, if treated scientifically, you can get a revenue in ten years.

"The first thing you get out, by a scientific treatment, is eight-inch ties. And if you treat a hickory forest right you get your revenue just as soon as you can cut ax handles. Five-inch hickory gives four ax handles.

"Here is an important point: There has been a kind of superstition among foresters that not more than \$10 an acre ought to be paid for forest land for commercial cutting, but that tradition is outdated now by the fact that the cost of most varieties of lumber has tripled in the last ten years.

"Only science and authority make prompt commercial cutting possible in reforested areas.

"Think, wood workers, what the newspapers are up against in the matter of wood pulp, and ponder your case."

LIKE the fabled Johnny Appleseed, who went from town to town, planting as he went, Charles Lathrop Pack, president of the American Forestry Association, is going up and down the country advocating the planting of trees, hammering day and night on the need of a national forestry policy. The demand for Memorial Avenues, Roads of Remembrance, Victory Boulevards, all planted with trees in honor of the men who

gave their lives for their country, is meeting with a remarkable response. Women's clubs, churches, rotary clubs, kiwanis clubs, patriotic societies and individuals are planting trees in rows, groups and groves.—*Pittsburgh Post*.

The American Forestry Association is urging the planting of memorial trees and creating "Roads of Remembrance," as a

simple and effective way of bringing the great principle of reforestation before the public mind and keeping it there. To interest the people in trees is the first step in the process of establishing such automatic recognition of the value and need of a national forest policy as shall be effective to save wide areas of country from climatic calamity, create great wealth in timberland, and avoid the present serious loss by

EDITORS FOR NATIONAL FOREST POLICY

fires. The foresters have hit upon an excellent idea: to plant trees as memorials of distinguished men has an appeal which is of genuine service to all the people as well as carrying a romantic tradition of enduring strength in the national character. Mr. Charles L. Pack, the president of the American Forestry Association, urges the planting of trees in all parts of the country as memorials to Theodore Roosevelt at this time of general commemoration of his birthday; recalling Roosevelt's strong interest in the subject, Mr. Pack says: "I do not believe the human mind can devise a more suitable memorial to Theodore Roosevelt than a movement which will look to preserving the forests of the country."

The foresters point out that the forests are like a bank account; they cannot be continually drawn upon without making some deposits. A national forest policy is a need which cannot be gainsaid; it is not a project for the benefit of the lumberman or the paper-maker or the work-worker alone; it is in the interest of the whole population.—*New York Evening Sun.*

The American Forestry Association points out that the demands of France and Belgium may double the call for American lumber. Three and a half billion board feet of logs and lumber were exported annually before the war; seven billion may be needed now. In 1918 the fire loss was \$28,500,000, not much if one is thinking in billions, but a good deal from any other point of view. The acreage figures are more impressive: Eight billion four hundred million acres were burned over. The layman can do little to increase the stock of trees. But he can do a good deal, especially at this time of year, to save what we have. He can be careful with his camp fires, whether he thinks the ranger will catch him or not, can watch where his matches and cigarette stubs go, and can teach the gospel of fire caution to other people. The forests of

California are not ours alone; they belong to the nation.—*San Francisco Call.*

The coal miners' strike has brought vividly to the public comprehension how dependent the country is on the coal supply. Wood is the only practical substitute for coal, and wood can be produced in unlimited quantities. Forests have been for

pulp out of which print paper is made is consuming the growth of thousands of acres of forests annually.

Without regard to fuel, a wood famine would be almost as great a calamity as a coal famine, and it should be provided against.—*Nashville Banner.*

Great Britain has determined to spend \$17,000,000 in a ten-year campaign to replant as forest areas 250,000 acres of land to replace timber used during the war in France.

The United States could do no better than to follow the example of Great Britain and determine at once upon a broad plan for reforestation. Thus far the lumbering industry in this country has been one big problem in subtraction. If the nation does not begin to add and multiply before long, the only possible answer will be zero.—*Athens, Ohio, Messenger.*

It is gratifying to note that there is considerable interest in tree planting in Peoria at this time. No little of this interest is due to the campaign of the American Forestry Association which is attempting to get people to "plant a tree in America for every tree destroyed during the war." The forestry men are specially alert in their efforts to get trees planted along roads and public driveways—thus putting to practical use much land that has been bearing little except weeds in the decades gone by.—*Peoria, Illinois Journal.*

With thousands more interested in trees, thousands more will be interested in the ways and whereof of forest policy.—*Minneapolis News.*

The president of the American Forestry Association of Washington has issued a call to the people to beautify their highways as memorials to the men who fought for world freedom. Good roads and tree planting go hand in hand.—*Elkins, West Virginia, Inter-Mountain.*

EVEN A COAL STRIKE MAY HAVE SOME BENEFICIAL EFFECT IF IT LASTS LONG ENOUGH



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This cartoon by Darling points forcibly to the value of a woodlot regardless of whether we have coal strikes or not.

centuries systematically conserved in Europe, and we must emulate and improve on the European example. And it is not because alone of the possibility of an exhausted coal supply that a production of wood is needed. There is an insatiable and increasing demand for lumber that can't be met after awhile if the forests are not replenished, and the demand for wood

STATE NEWS

CALIFORNIA

THE number of fires and the damage resulting in the area covered by the Weeks Law agreement in California during the 1919 fire season conclusively shows the necessity of increased co-operation under this law.

An appropriation, made by the California Legislature for fire protection work, became available July 22 and on July 25 four Weeks Law patrolmen were appointed by the State Forester and took up the task of preventing and combating fires. Approximately three million acres of the Sierra Nevada watersheds in Northern California were thus, for the first time, brought under protection.

The district assigned to each patrolman was large, too large in fact, to permit the effective patrol work that is necessary. The area placed under protection is one of great fire hazard due to climatic condition. At the same time its value as a watershed is immeasurable.

One hundred and sixteen fires occurred in the protected area during the eighty-two days of the fire season that remained after the appointment of the Weeks Law men.

Several of the fires, had they not been systematically fought, would have swept from the foothills into the National Forests.

Residents of the districts in which fires occurred expressed great satisfaction with the assistance given them to combat flames that threatened their property. Several landowners expressed a desire to aid financially the work of the fire patrolmen. In one county the Supervisors, wishing to do their share toward protecting property in the county, voted to pay bills for food required by fire fighters called by patrolmen.

Sentiment in favor of fire protection work was greatly increased in the counties in which Weeks Law men worked. While the men were kept busy much of the time with fire fighting they still found time in which to organize voluntary fire fighting companies, arrange for the placement of county equipment in districts of fire hazard and at all times they preached the gospel of fire prevention.

The fire season just closed has been one of the most serious on record in California, owing to a succession of dry seasons and the presence, during the fire season, of extremely high winds. It makes one shudder to think what would have been the result in the Sierra foothills during the recent summer months had there been no fire protection work. As it is the fire-blackened district is far too large and additional co-operation under the Weeks Law as well as increased appropriations by

the state are necessary if the ravages of fire in the foothills of the Sierras are to be stopped.

IDAHO

IN accord with almost unanimous sentiment in Idaho and in response to considerations vitally affecting adjoining National Forests, Congress has set apart 1,116,000 acres of land in Idaho known as the Thunder Mountain region, as National Forest lands. This great tract, difficult of access and having not over one per cent of its area suitable for agriculture, has for years been the scene of destructive fires and devastation due to overgrazing. It is now to be added to the Payette National Forest which adjoins it on the south and west, and the Idaho National Forest which adjoins it on the north and west. The area lies approximately 100 miles northeast of Boise. Because uncontrolled, it has been a recurring menace to the adjoining National Forests by reason of fires that have gained great headway in its vast unpatrolled regions.

IOWA

A REPRESENTATIVE of the Forest Service who recently visited Iowa calls attention to the fact that there is still a considerable area of timberlands in the State. The value of these lands has been only partially appreciated, according to the forester. Three-quarters of the Nation's timberland is privately owned, while but one-quarter is Government owned, and consequently it is in the privately owned forests, as well as the others, that conservation must be practiced. To avoid an increasingly serious timber shortage, it is essential that all of these lands be properly handled to produce timber and other forest products.

Because of the present high price of lumber the timber resources of Iowa have assumed an importance entirely unlooked for a few years ago. The representative of the Forest Service declared that there is a good opportunity for farmers of southeastern Iowa, particularly, to make use of their nonagricultural lands and the islands of the Mississippi by planting quick-growing trees, such as cottonwood. He also urged farmers to use small corners of their farms for this purpose.

MAINE

THE Legislature of 1919, by making an appropriation of \$5000.00 for the year 1919 and \$10,000.00 for the year 1920, for purchase of lands and general forestry purposes, made it possible for the State Forestry Department to start two new pro-

jects, namely, Forest Fire Protection and Slash Disposal in Organized Towns. Prior to this year, the organized towns with a forest area of about 4,500,000 acres never had any fire protection of any kind; while the unorganized towns (so called wild lands) are protected by a good sized appropriation and a good organization of Chief Wardens, Deputy Wardens, Watchmen, and Patrolmen. The present forest law makes the selection of each organized town Forest Fire Wardens of their respective towns, but does not provide for any funds either to protect the forests or fight fires. Without funds these Forest Fire Wardens are almost helpless. By the passage of the above named appropriation it gave the State Forestry Department a chance to start some forest protection in organized towns. Two steel lookout towers were erected, one on Agamenticus Mountain in the town of York and the other on Ossipee Mountain in the town of Waterboro, both in the County of York. These towers are located in the heart of the best white pine section of the State of Maine and are equipped with telephone communication with the Selectmen of the towns covered by these places, panoramic maps, binoculars, and range finders. The department contemplates establishing two more stations, one in the town of Denmark and the other in the town of Parsonsfield. The view from these two stations will reach the view from the nearest station in the Maine Forestry District which is located in the unorganized town of Grafton.

MONTANA

ONE billion feet of timber killed by 1415 fires is the estimate given for Montana's tremendous forest fire losses for the season just closed. Half of the fires were started by human agency and were preventable. The fires burned over 570,000 acres of land and were suppressed at a cost of \$1,200,000, according to figures compiled by the forestry office at Missoula.

A district logging engineer with headquarters at Missoula reports that he has seen cedar trees more than 2000 years old, still alive and growing in the Kaniku forest which is in the extreme northeastern corner of Washington. "These trees," says the engineer, "varied in size from a foot to ten feet in diameter. I used a boring instrument on them and found that the trees were in all cases 2000 years old and some of them nearly 3000. The wood is firm and is a potential source of high grade timber. I know of no place in the United States, except the redwood forests, where trees of that age may be found."

NEW JERSEY

New Jersey has been extremely fortunate with regard to fire losses during the past summer and fall, in comparison with other sections of the country. The excessive rainfall has almost prevented fires from starting. From August 1st until the middle of November there have been less than ten fires in the entire state, and all of these have been trifling. For this period the total has usually been from 150 to 300. Last year during the four months there were 152 fires, while the year before there were 241.

The three year terms of most of the local firewardens within the state expire at the end of the year. The freedom from fires has enabled the staff to devote much of its energy to the reorganization and strengthening of this field force. The dead wood is being replaced by good timber, and special efforts are being made to insure that wardens who have displayed ability are reappointed.

The withdrawal of one of the division wardens from the Forest Fire Service to take up educational work brings about the first change in the staff of the state organization.

NEW YORK

THAT America can produce better forests than nature has given us, under right application of forestry was the declaration of Dr. Hugh P. Baker, Dean of the New York State College of Forestry at Syracuse before the American Paper and Pulp association in convention at New York, when the nation's paper makers asked him to discuss the report of their committee on forestry. He said: "The long growing Adirondack and other forests today not aided by man, may be growing at the rate of 200 board feet per year. The Black Forest, and other forest areas of Europe, not as well adapted to forest growth as very much of the forest area of this country, before the war were producing more than a thousand board feet per acre per year, and at the same time conserving water more effectively, were better places for fish and game, and were as effective as man can make a forest for recreational purposes.

"The difficult coal situation which has been before the public and our national government is educating the people in this country to the point where it is barely possible that the public may force the maintaining of productivity of forest lands as it looks as if the government may force the productivity from coal mines. It will be much better if the forest industries will solve these problems themselves by providing unity of action rather than to be forced into an awkward situation by what seems to be public welfare.

"New York probably leads the states of the union in the reforestation of forest lands. Great credit is due the State Con-

servation Commission for the aggressive way in which it has carried on reforestation. What they are doing, however, is but a drop in the bucket. What is the reforestation of three or four thousand acres when the State alone owns hundreds of thousand of acres which must be partially or wholly reforested before they can be put into profitable condition. The state should bond itself, if necessary, to protect and encourage the forest industries of the state as has been done for better highways and a great barge canal. There should be inducements held out to the owners of agricultural land to get better farm crops. Forestry is second in importance to agriculture as a fundamental to the life of a nation."

Uncle Sam has given formal recognition to the State Ranger School of the New York State College of Forestry at Syracuse, by sending to the school four of his wounded soldiers, and by preparing to send others from all parts of the United States. While going to school they are being paid \$80 a month from the government. The Federal Board of Vocational Training has particularly been interested in the opportunity for building back into profitable occupations those soldiers whose lungs were torn by gas, or who were injured in battle, by sending them into the big out-of-doors where they can be trained for service which gives them an open air life.

OREGON

AT a meeting of forest protective agencies held at Klamath Falls, Oregon, October 21, and 22, 1919, representatives of the United States Forest Service, State Forest Service of Oregon, Klamath Indian Service, Crater National Park, Oregon Agricultural College, Western Forestry and Conservation Association and Klamath-Lake Counties Forest Fire Association being present the following resolutions were unanimously adopted:

In view of the importance of the forest industry in the State of Oregon and the large percentage of the taxes of the State paid by said industry, and since insect depredations in the timber are in certain localities a decided menace, we feel that greater attention should be given to forest entomology in the state. We, therefore urge the Oregon Agricultural College to build up a strong department of Forest Entomology and through such department lend assistance to owners of timber in the state in control of insect depredations.

In view of the serious fires which occurred in Oregon the past season and the expense involved in fighting said fires, it is apparent that the appropriation for protection of Oregon and California Grant Lands will not be sufficient to pay the pro rata share of cost of protection of said lands. We, therefore urge upon our Congressional delegation that they use every

effort to see that \$15,000.00 additional be provided for protection of these lands the current fiscal year.

In view of the yearly damage to timber (particularly yellow pine) resulting from insect depredations, and the imperative need of perfecting methods for the control of said depredations, we earnestly request the United States Forest Service to increase its personnel in Oregon for such work and further ask that the service co-operate with and extend assistance to private owners in the State of Oregon looking to more efficient insect control.

Whereas, the grazing areas in the State of Oregon are being reduced yearly owing to homestead occupation, reproduction of forests, etc., a growing congestion on the ranges seriously threatens the live stock industry unless some federal regulation is provided on all public lands; and

Whereas, there are over three million acres in the Oregon and California Land Grant, more or less of which will provide feed for live stock pending disposal under the public land laws;

Resolved, that we respectfully urge the Department of the Interior to adopt and put into effect a policy of leasing the grazing privileges on these Oregon and California Lands to live stock growers, and that the proceeds be used to increase the present appropriation for the protection of said lands from forest fire.

Whereas, there are located in Deschutes, Klamath and Lake Counties, State of Oregon approximately 83,000 acres of land being administered by the Interior Department of the United States Government on which is growing more or less lodgepole pine of little commercial value, but which constitutes an extremely bad fire menace to adjoining National Forest Lands and lands belonging to private individuals or companies on which is growing a stand of commercial yellow pine timber, and as our state laws require the private owners to provide an adequate fire patrol to prevent loss from forest fires, and to do so it has been necessary in the past for said owners to patrol and fight fires upon the Interior Department lands for the protection of their own interests;

Therefore, we urge upon our representatives in Congress the necessity for an appropriation of not less than \$5000.00 per annum to be used for the protection of these lands; and we urgently request the Secretary of the Interior to make request for this amount of money for the above purposes in his next annual budget.

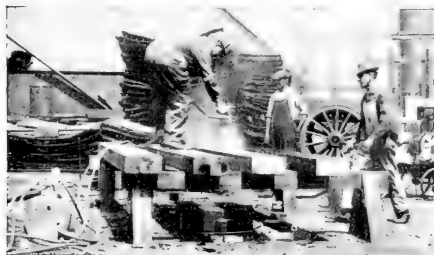
WISCONSIN

THE Forest Products Laboratory, at Madison, has prepared a list of government and state bulletins of value to woodlot owners who wish to market their products. This list will be furnished by the laboratory to anyone upon request.



Replacement of porch columns and joists in framing of three floors is an annual occurrence at most apartment houses of this type.

Arrows point to a badly rotted column on the third floor, to a new column just put in on the second floor, and on the walk to rotted columns and stringers already taken down



Applying surface treatment by spraying Carbosota on contact surfaces.

The Dangers of Decay

Wooden back porches and stairs of apartment buildings, factories, warehouses, and other industrial structures must be protected against decay to avoid becoming a serious menace to tenants, employees, and the public; likewise to reduce the continual expense of replacement, piece by piece.



The grade of lumber generally employed and the nature of the exposure, cause rapid development of decay and unsuspected weakening of the structure, particularly at points of contact.

It is, perhaps, a very small detail—to protect these structures from premature decay, but a precaution that the builder should encourage from the standpoint of safety and economy. Elimination of decay is physical protection to all, children and adults alike.

Carbosota Creosote Oil, properly applied to points of contact before erection, will retard decay and materially increase the life of even the cheapest lumber.

Used as a stain, it gives the structure a practical and attractive dark brown color at considerably lower cost than paint.

Carbosota Creosote Oil is a pure refined coal-tar creosote, standardized for non-pressure treatments.

Wood Preservation is a "Safety-First" measure.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exceptions should be made in such cases and treatment modified accordingly.)

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE advisory committee which was asked for by the Minister of Lands and Forests of Quebec to discuss with his Chief Forester a revision of the cutting regulations and also the future forest policy of the Province, held its first meeting in Quebec City and after a very interesting discussion agreed to certain recommendations to the Minister. The most important of these was that there be appointed a committee which should represent the lumber and pulp interests, the settlers' interests, and forestry and that this committee should act in an advisory capacity to the Minister of Lands and Forests and his Department in framing regulations for the use and perpetuation of the forests. It is hoped that if this suggestion is adopted most of the present causes of friction between the lumber interests and the settlers can be eliminated.

The forest fire situation in New Brunswick during the past season was better than in the previous year. So many fires were due to carelessness that October ninth was adopted as "Fire Prevention Day" throughout Canada to try and impress on people the necessity for care in preventing all kinds of fires. The total number of fires in New Brunswick's forests for the season were 342—70 per cent set by railroads causing 3.5 per cent of the damage; 7 per cent set by campers causing 31.7 per cent of the damage; 11.5 per cent set by settlers causing 44.1 per cent of the damage; 3.5 per cent set by operators causing 7.1 per cent of the damage; 8 per cent set by accidental and incendiary causing 13 per cent of the damage. Most of the fires occurred in May and June. The above shows that campers and settlers were the chief contributing causes. Eighteen square miles were burnt with a loss of \$154,155. Thirty-six prosecutions were instituted with 29 convictions. About 70 miles of telephone lines were built co-operatively by the Government and the Bathurst Lumber Company and forty more miles will be built to connect with a lookout station. Twenty-six returned soldiers were employed. Four hundred and ninety acres of land belonging to the Bathurst Lumber Company have been set aside as a forest reserve and experimental cuttings are taking place under a plan worked out by Dr. Howe and in immediate charge of Forester W. M. Robertson.

The same kind of work is being done under the supervision of Mr. R. W. Lyons on the Vermilion Limit of the Laurentide

Company, Ltd. The Department of Lands and Forests has been asked to set aside these experimental areas as forest reserves.

The fire season in Quebec has been, from the standpoint of weather, the worst in several years, but the number of fires was not large. Contrary to the experience in New Brunswick, practically no difficulty was had with settlers. The worst fires were caused by dam-keepers and river-drivers of the operators. This is a most curious situation, as these operators are paying the cost of fire protection and are hiring the fire rangers, so that they are not only destroying their own property but it is being done by their own employees. Of course the answer is the lack of an appreciation of the necessity of preventing forest fires on the part of some of the managers of woods operations and their failure to enforce the rules of their departments. Often the sub-managers and higher foremen feel that the fire protection work, in some way, takes away from their authority and interferes with their work, and then too, sometimes they are afraid their men may leave if they are particular about enforcing the fire regulations. The situation is serious and heads of companies should insist that their own men are controlled and not allowed to set forest fires.

Mr. S. L. de Carteret, Forester for the Brown Corporation, will now be in charge of all the timberlands of the Brown Corporation, with headquarters in Quebec City. Mr. de Carteret was, for several years, engaged in working up a scheme for timberland insurance, which he handled very successfully.

Mr. L. A. Nix, graduate of Syracuse University, sometime with the U. S. Forest Service, and who served during the war in the Chemical Division at Edgewood Arsenal, Baltimore, has resigned from the staff of the Forestry Department of the St. Maurice Paper Company and returned to the Laurentide Company for whom he worked before enlisting.

A very interesting article on the work of the Forestry Department of Syracuse University, appears in the Royal Spanish Society of the Friends of Trees.

The Canadian Export Paper Company, Ltd., of Montreal, is sending Mr. W. G. Mitchell abroad to make a study of conditions in the Pulp and Paper Industry in Scandinavia, Finland and Russia.

The Aviation Branch of the St. Maurice Forest Protective Association has completed its work for the season and the planes loaned by the Government will be thoroughly overhauled and put in condition for further experimental work next season. Four hundred pictures 8x10 inches, covering 4,000x3,200 feet each, were taken at an altitude of 5,000 feet. The pictures show all kinds of country, settled, villages, swamps, burns, cut-over, regenerating naturally, planted and all sorts of timber types. Those so far developed and printed exceed all expectations and it is confidently felt that aerial photography will revolutionize timber mapping. The accuracy with which areas in various types, burns, water and so forth can be measured, drainage basins determined and topography studied will add much to the value of the work. Those wishing to buy timberlands, or banks, or other corporations loaning money on timberlands can now be sure of what they are getting for their money.

Alarm is now being felt in Queensland at the very rapid depletion of available timber supplies, particularly softwoods. The Forestry Service is now facing the heavy responsibility of attempting to make good the deliberate dissipation of the forest asset which has characterized the past. Forest reservations have been set aside and now total 3,700,000 acres, but the task of reforestation has been left so late that it will be many years before its effect will be felt.

In Norway it is proposed to build a tunnel to carry logs past a large dam built for water power development. This is an interesting way of solving the problem.

There is practically a complete failure of the white spruce seed crop in the east. The trees in eastern Canada have not seeded for two years and Black Hills and Norway spruce seed has had to be used. Likewise, owing to the rapidly increasing demand, the prices of nursery stock have risen tremendously.

The seaplane purchased by the Brown Corporation, one of two which will be used in mapping their timberlands, was last reported as having flown from New York to Burlington, Vermont. It is expected to arrive at its base on the St. Maurice River shortly.

The plantations made by Chief Forester G. C. Piche, of the Quebec Forest Service, on the drifting sands at Lachute and Ber-

No. 1

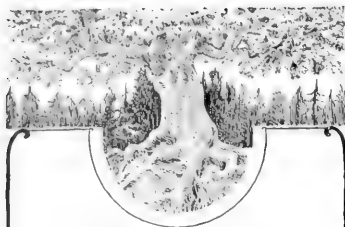
The Making of Southern Pine

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thier some seven years ago, have made splendid progress and are now six to ten feet in height for Norway spruce and eight to ten feet for white pine. These plantations were made to stop the encroachment of the sand on farming country and have answered the purpose admirably. The growth of the spruce in absolutely pure sand is quite remarkable. It is too bad that the plantations have not been continued.

Messrs. Clyde Leavitt, J. M. Swaine and Arnold Hansen made a trip to the limits of the River Ouelle Lumber Company at River Manie, in the company of W. G. Power, President of the Canadian Lumbermen's Association, to investigate the ravages of the spruce budworm and spruce bark beetle. They report that the trees are beginning to recover from the attack but that the number of spruce trees blown down as the result of cutting to a diameter limit is very large, causing a great deal of waste.

A course in paper-making has been started in the Laurentide Night School with

forty-five entrants. The course will begin with lectures on forestry and will be followed by others on logging, wood preparation, grinding, sulphite making, paper-making, purchasing, selling, engineering and management. One hundred and fifty pupils are enrolled for the winter session of the school.

Robson Black, Secretary of the Canadian Forestry Association, has finished a most successful lecturing trip through the Prairie Provinces. He has held ten public meetings in Winnipeg alone, sometimes at the rate of two or three per day, addressing business men, bankers, mortgage companies and so forth. In Prince Albert he had an audience of 700 men and women. Much enthusiasm for the conservation of timber resources was aroused and the idea has taken firm root. The Forestry Car which is making a tour of the country has met with the greatest success.

The reports of damage from forest fires in the Prairie Provinces during the past summer will run into millions of dollars.

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

THE Forestry Club has had three interesting meetings since October 1st. Twenty-five men left Berkeley early Sunday morning, October 5th and went by train and boat to Fairfax, for a hike through the picturesque hills of Marin County. The route of the trip was across a chaparral covered ridge to the new La Guitas reservoir of the Marin Municipal Water District. This artificial lake with its well forested watershed is now full to capacity for the first time and has added greatly to the natural beauties of the region. After following down La Guitas Creek to the junction of the Little Carson Creek a halt was made for lunch beneath the shade of some fine redwood, Douglas fir and Tanbark oak trees. The afternoon trip brought us back to Fairfax by way of the headwaters of the Little Carson. Twenty-five species of trees were noted during the day.

The next regular meeting was held on October 17th, when Professor, David T. Mason spoke to the club about his work with the Treasury Department in the administration of the income tax to the lumber industry.

An open air meeting in the Berkeley Hills was held on October 28th at the old camp fire place in Telegraph Canyon. After a hearty meal of "weenies," coffee and pie, Mr. S. B. Detwiler, who is in charge of the White Pine Blister Rust eradication, told the boys something of the character of the work being done in scout-

ing for the disease and the nature of the quarantine by means of which it is hoped that it may be kept out of the western forests. Mr. Posey, who is directing the work in California and several of his field men were also guests of the forestry club at this camp fire meeting.

During the regular business session it was decided that the forestry club should recommend to the Associated Students' organization the planting of a memorial grove of Sequoia gigantea on a suitable site in Strawberry Canyon to the 80 University of California men who gave their lives in the World War. It is hoped that the work can be done as the "Labor Day" project by the entire student body on February 29, 1920. It has been the custom for several years for students and faculty to lay aside regular duties on this extra day and all join in some work of improvement of beautification needed about the campus. The forestry club feels that the planting of such a memorial grove is the most fitting way in which the coming Labor Day can be spent.

Professor Woodridge Metcalf spent a week end recently with the Santa Cruz high school forestry class which is being conducted by R. E. Burton, a former president of the University of California Forestry Club. An interesting field trip through some of the cut over lands in the vicinity of Santa Cruz was made the opportunity for pointing out the necessity for permanent forests in this region. Many

(Continued on Page 1563)

\$7,500,000**BROWN COMPANY****(Formerly the Berlin Mills Company)****6 % Serial Gold Debenture Bonds—Series "A"****AUTHORIZED \$15,000,000****OUTSTANDING \$7,500,000**

Dated November 15, 1919.

Interest payable May and November 15.

Due in annual installments of \$375,000 each November 15, 1920 to 1939 inclusive.

Interest payable without deduction for any Federal Normal Income Tax up to 2%**OLD COLONY TRUST COMPANY, BOSTON, Trustee****HISTORY AND BUSINESS**

The Brown Company, founded in 1852, is the largest manufacturer in this country of bleached sulphite fibre pulp and kraft wrapping paper and it also manufactures bond paper, lumber and allied products. Sales in recent years have averaged more than \$23,000,000 annually. Its operations in Canada are conducted through a subsidiary, the Brown Corporation, of Canada, of which the Brown Company owns all the capital stock.

PROPERTY

The mill properties at Berlin and Gorham, N. H., consist of two paper mills, two sulphite fibre mills, a saw-mill and five hydro-electric plants with an installed capacity of 25,000 H. P. and a steam power plant with a capacity of 20,000 H. P.

The Canadian plant consists of a pulp mill and water-power for manufacturing sulphate fibre, which product is shipped free of duty to the American plants.

A practically perpetual supply of raw material is assured by ownership in fee simple of more than 400,000 acres of timber land in Maine, New Hampshire and Vermont, and the acquisition in Canada through the Brown Corporation of more than 800,000 acres in fee simple and stumpage and about 1,700,000 acres in timber limits under perpetual license. Total holdings are over 4,530 square miles, conservatively estimated to contain 15,000,000 cords.

ASSETS

The cash investment in the American mill properties alone is over \$14,000,000.

After the application of the proceeds of these bonds the net quick assets of the Brown Company will be in excess of \$12,000,000, and the tangible assets applicable to this issue in excess of \$38,000,000.

The combined tangible assets of the affiliated companies are in excess of \$50,000,000.

EARNINGS

Earnings of the Brown Company, as certified by Messrs. Niles & Niles, Certified Public Accountants, for the last five fiscal years, after taxes, depreciation and interest have averaged \$2,190,222, or **nearly five times the interest on this issue**, and for the last three fiscal years have averaged \$3,102,369, or **nearly seven times the interest on this issue**, to which are to be added the earnings of the Brown Corporation for the last three fiscal years, averaging \$507,617.

In addition to the above earnings, special reserves have been set up by the Brown Company during the last five years averaging \$445,658, and by the Brown Corporation during the last three years averaging \$272,617.

PROVISIONS

The Indenture securing these bonds has been so drawn that no further mortgage may be placed upon the present assets while any of this issue is outstanding. The Company covenants to maintain net tangible assets of 300% of Series "A" at any time outstanding, and total tangible assets of 200% of total liabilities, so long as any bonds issued under this Indenture remain outstanding. Furthermore, the Company will maintain net quick assets, exclusive of inter-company accounts, at not less than 75% of all bonds of Series "A" and previously issued funded debt outstanding, and at not less than 50% of the total funded debt outstanding during the life of any bonds issued under this Indenture.

MATURITIES	APPROXIMATE	
	PRICE	YIELD
1920 to 1922 inclusive.....	100	6.00%
1923 and 1924.....	99½	6.15%
1925 to 1929 inclusive.....	99	6.15%
1930 to 1934 inclusive.....	98½	6.15%
1935 to 1939 inclusive.....	98	6.15%

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The statements contained herein are not guaranteed, but are based upon information which we believe to be accurate and reliable, and upon which we have acted in the purchase of these bonds

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Fillbert Roth.....	\$1.50
FOREST REGULATION—Fillbert Roth.....	2.00
PRACTICAL TREE REPAIR—By Elbert Peets.....	1.15
THE LUMBER INDUSTRY—By R. S. Kellogg.....	2.10
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones.....	2.10
FOREST VALUATION—By H. H. Chapman.....	2.50
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw.....	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard.....	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part.....	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot.....	1.35
LUMBER AND ITS USES—R. S. Kellogg.....	1.15
TIMBER OF TREES IN LAWN, STREET AND PARK—B. E. Fernow.....	2.17
NORTH AMERICAN TREES—N. L. Britton.....	1.30
KEY TO THE TREES—Collins and Preston.....	1.50
THE FARM WOODLOT—E. C. Cheyney and J. P. Waulding.....	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record.....	1.75
PLANE SURVEYING—John C. Tracy.....	4.00
FOREST MENSURATION—Henry Solon Graves.....	3.61
THE ECONOMICS OF FORESTRY—B. E. Fernow.....	4.00
FIRST BOOK OF FORESTRY—Fillbert Roth.....	1.10
PRACTICAL FORESTRY—A. S. Fuller.....	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel J. Green.....	2.00
TREES IN WIND—J. J. Davis and C. D. Jarvis.....	2.00
MANUAL OF THE TREES OF NORTH AMERICA (exclusive of Mexico)—Chas. Sprague Sargent.....	6.50
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume.....	7.00
HANDBOOK OF FOREST TREES OF THE NORTHWESTERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough.....	6.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland.....	1.75
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe.....	1.50
TREES OF NEW ENGLAND—L. D. Davis and J. B. Sargent.....	5.90
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst.....	1.50
TREES—H. Marshall Ward.....	1.50
OUR NATIONAL PARKS—John Muir.....	1.91
LOGGING—Ralph C. Bryant.....	4.00
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott.....	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes.....	3.50
THE PRINCIPLES OF HANDLING WOODLAND—Henry Solon Graves.....	2.00
SHADE TREES IN TOWNS AND CITIES—William Solon Graves.....	3.00
THE TREE GUIDE—By Julia Ellen Rogers.....	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary.....	2.12
FARM FORESTRY—Alfred Akerman.....	.57
THE THEORY AND PRACTICE OF WINDING PLANTS (in forest organization)—A. B. Recknagel.....	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown.....	2.50
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record.....	1.75
CHOICE OF TREES—J. J. Levison.....	1.75
TREE PRUNING—A. Des Cars.....	.65
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss.....	3.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Tounney.....	3.50
THE FIELD AND FOREST TREES—By Dr. Harold Urban.....	2.25
FIELD BOOK OF AMERICAN TREES AND SHRUBS—F. Schuyler Mathews.....	2.50
FARM FORESTRY—By John Arden Ferguson.....	2.10
THE BOOK OF FORESTRY—By Frederick F. Moon.....	1.50
OUR FIELD AND FOREST TREES—By Mand Gole.....	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor.....	1.50
THE LAND WE LIVE IN—By Overton Price.....	2.70
WOOD AND FOREST—By William Noyes.....	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney.....	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette.....	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.....	2.50
MANUAL OF POISONOUS PLANTS—By H. P. Palmer.....	5.35
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THE STORY OF THE FOREST—By J. Gordon Dorrance.....	.65
FOREST MANAGEMENT—By A. B. Recknagel and John Bentley, Jr.....	2.60
THE FOREST RANGER'S GUIDE—By John G. Burroughs.....	1.50
TIMBER, ITS STRENGTH, SEASONING AND GRADING—By H. S. Betts.....	3.10

* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

FORESTRY PRIZE ESSAY OFFER

A PRIZE essay on forestry is being offered by the Indiana Division of Forestry, the subject being: Private versus State Forests.

The contest is open to the pupils of both public and parochial schools. For the best essay from the seventh and eighth grades, respectively, a prize of \$5.00 will be given. For the best essay from each of the high school classes a prize of \$7.50

will be given. The offer is made to all schools doing work equivalent to the grade or high schools. The essay must not exceed 2,000 words. It must be mailed not later than May 15, 1920, to the State Forester at Indianapolis, Indiana, Room 7, State House. Contestants should write the State Forester for particulars and rules governing the contest.

BOOK REVIEWS

THRIFT AND CONSERVATION, by J. F. Chamberlain. J. B. Lippincott, Philadelphia. Price, \$1.40.

Very aptly is the President quoted in this little book, just from the Lippincott presses—"To practice thrift in peace times is a virtue and brings great benefit to the individual at all times." During the last few years, and especially since the beginning of the war, the term "thrift" has been much more in the public mind and on the public tongue than heretofore. Men and women are talking thrift and economy; children are writing essays on thrift and are earning and saving as never before.

There are lectures and published plans and outlines telling how to earn and invest and save, and the authors have set forth in this book the needs for this teaching of thrift, together with many practical applications of the thrift principles to the life of the people as made possible through such teaching. The causes leading up to the spend thrift practices of our people are set forth and the necessity for rational habits in proper saving and economy are made plain. And the distinction between true and false economy is carefully pointed out all through the book, i. e., thrift does not consist in hoarding or in miserly practices.

One does not save in order to have simply but in order to have that he may use wisely. He saves against the time of emergency, in his own life and those dependent upon him, and that he may do his part in community or state through the channels of public or private service. So changed is the attitude of the public mind that where formerly a man of thrift and saving tendencies was looked upon with something of contempt and pity, now the man who is not reasonably thrifty or economical is the object of more or less adverse criticism. It has at last become dignified to conserve instead of waste—to practice thrift rather than spend foolishly and we predict that this book by the Chamberlains will point the way for many who wish sincerely and intelligently to establish the habits of thrift.

The 1919 Forest Club Annual, of the College of Forestry and Lumbering, at the University of Washington, Seattle, which is just out, is full of interest and value. Its compilation reflects great credit and the organization, and editors of the Annual, are to be congratulated on the publication. A few copies are available to interested foresters and lumbermen, who may procure a copy by writing to the Secretary of the Forest Club, University of Washington, Seattle, Washington.

FOREST SCHOOL NOTES

(Continued from Page 1560)

of the thirteen boys in the class are planning to take up forestry in the University.

Professor Walter Mulford has been appointed a member of the Research Committee of the Save the Redwoods League, which organization is conducting a very active campaign for the setting aside of some of the finest bodies of redwood in Humboldt County as either National or State parks. The chairman of this committee is Meritt B. Pratt, now deputy State Forester, but formerly assistant professor of Forestry at Berkeley.

UNIVERSITY OF MONTANA

THE Forest School opened on October 1st with an enrollment of 60 students, of whom nearly half are non-residents of Montana. States represented are South Dakota, Illinois, Ohio, Iowa, California, Washington, Colorado, Connecticut, Indiana, New York, Wisconsin, Missouri, Minnesota, Nebraska, Massachusetts, South Dakota, Kansas, and Idaho. Also one student from Canada, one from New Zealand, and two from the Phillipine Islands.

The Forest School counts itself very fortunate this year in having among its students Felix Franco, and Placido Decanay who are foresters from the Philippine Islands. These gentlemen are native Filipino foresters of a group of five Philippine forest officers who are being sent to schools of forestry in this country at the expense of the Philippine government. Both of these men have graduated from the government school of forestry in the Philippine Islands and have had experience as Forest Supervisors in the Philippine Forest Service.

The Forestry Club has started its series of lively meetings. Special consideration is being given this year by the members of the Forestry Club to the question of a national forest policy.

The annual meeting of officers of the Forestry Club resulted in the election of H. Whisler, a senior student, as president of the Club for the forthcoming year. R. A. Williams, William Zeh and G. M. DeJarnette, all junior students, were elected treasurer, secretary and vice-president.

Dean Skeels recently visited the annual session of the Pacific Logging Congress at Portland, Oregon, and a convention of representatives of the faculties of the schools of Forestry in the state universities of California, Oregon, Washington, Idaho and Montana. Dean Skeels has made an interesting report of the proceedings of the Logging Congress. Of especial interest to foresters of the northwest was the consideration given by the Logging Congress to conservation and forest protection prob-

lems in general and particularly to the issues which are leading towards the definition of a stronger policy of forestry for the nation.

Steps are being taken through state authorities for the acquisition of the Fort Missoula timber reservation as a working forest for the School of Forestry.

The faculty is co-operating in an important way with the Forest Service members of the Missoula branch of the Society of American Foresters in preparing a preliminary plan for such part of a national forestry policy as will apply to the intermountain region.

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RED CROSS ROLL CALL

Opportunity, Privilege, Duty confront YOU. The personal service of a million volunteers is needed November second to Armistice Day, the eleventh, to enlist every citizen in the world's greatest Army of Mercy.

Hopeful, grateful America appeals for the Red Cross spirit.

As a part in furthering a better policy of forestry Dean Skeels and Professors Spaulding, Fenska and Lansing are also preparing material for a complete report to the state authorities of Montana regarding the present forestry problems relating to state lands and looking towards improvement of the state policy for forestry matters in general.

New features for the short course for Forest Rangers which has for twelve years been held during the winter quarter of the school year will be courses of specialization in grazing and forest engineering.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

WASHINGTON, D. C.

By Force School: Lieut. Quentin Roosevelt.
By Tenley School: Elmer Kidwell, Benjamin Perry, Aubrey Reed, Hart Sonnenman

MONUMENT, COLO.

By Monument Red Cross: George P. Hagedorn, William H. Freeman, Francis J. Lavullette, George A. Bougher, Rex R. Wilson.

NEW HAVEN, CONN.

By Mr. George A. Cromie: Lieut. Samuel Osborn Cromie.

MIDDLETON, GA.

By Middleton School: Hascal Carl Smith.

WARE COUNTY, GA.

By Canteen Unit, American Red Cross: James Jules Beaton, James Brown, Alvin Claude Bozeman, Eugene Campbell, Fred Capps, Claude De Witt Crumless, Norman Ernest Daniels, Erley Davis, Dellie Gilliard, Lewis Gillis, Ivey Lee Gunter, Franklin Lewis Henderson, Aaron Holt, Lewis H. Hopkins, John Kelly, Warren Thompson Kent, Archie B. Liles, L. D. Moody, Clyde Mott, James A. Pierce, Milton Worth Porter, Leon Ray, William Rogers, Wadley E. Sharpe, Ralph Smith, John Spaulding, Charles S. Walden, Lonnie James, Jefferson D. Stow, Frank Teuten, Peter Archie Thrift, Andrew Thrift, Alfred W. Turner, Dewey White, Gerald Yarborough.

CHICAGO, ILL.

By Flossmoor Country Club: Corp. James M. Frothingham.

SOUTH BEND, IND.

By Impromptu Club: Howard Urquhart Snyder.

BINGHAM, MAINE

By Kennebec Chapter, D. A. R. & Century Club: Bingham, Maine heroes.

ORLANDO, MAINE

By Richard Gott: Wm. P. Hutchins.

ANDOVER, MASS.

By Mrs. C. W. Ward: Andrew K. Dunn.

SHARON, MASS.

By Mrs. W. E. Clark: Charles R. Wilbur.

MANCELONA, MICH.

By Antrim Iron Company: Jakow Sholobodi, William Bohl, Donald May, Venerable Lamer-son, George E. Puckett.

FORT OMAHA, NEB.

United States Army Balloon School: Walter J. Sorenson, Ellsworth B. Rinehart, Albert Lewis Coldiron.

SPRING LAKE, N. J.

By Dr. and Mrs. G. D. Murray: Jane A. Delano.

WEST COLLINGSWOOD, N. J.

West Collingswood School: Theodore Roosevelt, Robert Shields.

CHAUTAUQUA, N. Y.

Chautauqua Bird and Tree Club: Grant S. Norton.

EAST HAMPTON, LONG ISLAND, NEW YORK

By Dr. H. Lawrence Dowd: Meredith L. Dowd.

SCHNEVUS, N. Y.

By Mr. Thomas Broxholm: Samuel F. S. Broxholm.

WHITESBORO, N. Y.

Men's Bible Class of First Presbyterian Church: Copie Van Hessen, Fred Lamphere, Harry Sautter.

CLEVELAND, OHIO

By Theodore Dluzyuski: Walter Dluzyuski.

COLUMBUS, OHIO

By Independent Protestant Church: Richard Nienhart, Walter Biderman

NORTH LIMA, OHIO

By Trustees of Union Cemetery: Soldiers of Beaver Township who served in the World War.

CROSS CREEK, WASHINGTON COUNTY, PA.

By Mrs. Samuel Sturgeon: Theodore Roosevelt.

DOWNINGTON, PA.

By Frances Edge McIlvaine: Randolph Breese.

LEWISTOWN, PA.

By Miss Maggie E. Stine: Sergt. Ernest E. Stine, Paul N. Hostain.

PENBROOK, PA.

By Penbrook Community Civic Club: Boys of Penbrook District who died or were killed in Great War.

PROGRESS, PA.

By Penbrook Community Civic Club: Boys from Progress District who gave their lives in the Great War.

NASHVILLE, TENN.

By Robertson Academy: Lieut. John W. Overton.

ALEXANDRIA, VA.

By Parish Aid Society, Christ Church, which Washington attended: Sergt. Major John M. Leadbeater, Lieut. George Moncrief Anderton.

ST. ALBANS, VT.

By Woman's Club: Company B. of St. Albans, Machine Gun Company.

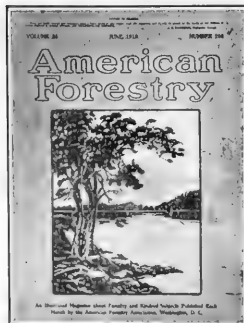
APPLETON, WIS.

Appleton High School: Edward Mach.

KOHLER, WIS.

By Village of Kohler: Soldiers and Sailors, Sheboygan County.

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PLANT MEMORIAL TREES

UNIVERSITY OF WASHINGTON

THE College of Forestry at the University of Washington opened the first quarter of the school year with an enrollment of 135—the largest in the history of the school. Students are registered from many sections of the United States and from Chile, Siberia, Sweden, England and the Philippines.

At a recent meeting of the Forest Club, Mr. F. E. Pape, Washington State Forester, outlined the four routes for the airplane fire patrol to be instituted in this state next summer.

The Hon. Clark V. Savidge, Commissioner of Public Lands of Washington, also addressed the foresters. He brought out the surprising fact that if all the state lands of Washington were in one block they would make an area twice the size of the state of Delaware. These lands are being handled solely for the benefit of the educational institutions of the state, and the schools are now realizing the interest on sixteen million dollars derived from state lands. While no forestry other than fire protection is being practiced at the present time, Mr. Savidge is looking forward to forest management of these lands when favorable conditions for making a start have been worked out.

The Forest Club, composed of the students in the College of Forestry, has entered on what promises to be the most successful year yet experienced, and the seventy entering freshmen are showing great interest and enthusiasm in the activities of the organization. The officers for the ensuing school year are, Willis G. Corbitt, of Seattle, president; S. S. Andrews, Boulder, Colorado, vice-president, and J. Kenneth Pearce, Portland, Oregon, secretary-treasurer. Arthur K. Roberts, Tacoma, Washington, will edit the 1920 "Forest Club Annual," of which Jack Shank, Alton, Illinois, is business manager.

TRI-STATE FORESTRY CONFERENCE

A CONFERENCE of foresters of Indiana, Ohio and Illinois held at Indianapolis on October 22 and 23, and very well attended, developed particularly valuable discussion on national and state forest policies. Resolutions were adopted demanding public and legislative action to assure a permanent timber supply. Others were as follows:

Resolved, That a system of taxation on timberlands be adopted which will discourage premature and wasteful cutting and encourage forest renewal. Be it

Resolved, That the states should greatly increase their forest holdings by the purchase of young second-growth and land

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adapted to reforestation made possible by a bond issue of 50 to 100 years maturity so the burden may be equally distributed through generations. Urging that large holdings by the states will present a steady and permanent source of supply which will stabilize timber prices.

Resolved, That this Conference urges upon our representatives in the Congress, the necessity for largely increased appropriations under the purchase clause of the Weeks Act, to extend the area of national forests, and particularly into the hardwood regions of West Virginia, Kentucky and Tennessee, from which the tree states concerned already draw a large portion of their hardwood supply.

Be it further urged, that the Federal Congress appropriate adequate funds for co-operation with the states in forestry, as it is doing in road building, agricultural extension, vocational education and other activities, with the especial object of encouraging farm forestry extension under the Smith-Lever Act, reforestation of idle lands and protection against fire. Be it

Resolved, That the states launch an extensive and thorough campaign through the press, the schools, the pulpit and mails, to arouse the public to the need of a state forest policy and necessity of action toward the assurance of a permanent timber supply.

It is furthermore urged, that forestry education should be made a progressive part of the public school curriculum.

acquisition of the lands, to maintain a very much more effective and permanent organization of experts who are already trained in the various activities connected with purchasing.

THE SECOND SOUTHERN FORESTRY CONGRESS

THE second meeting of the Southern Forestry Congress will be held in New Orleans, Louisiana, Wednesday, Thursday and Friday, January 28, 29 and 30, 1920. It will be recalled that the first Congress was held in Asheville, North Carolina, three years ago.

It is planned to devote the first day of this meeting to a discussion of the needs of the South for forestry, with special reference to the timberland policy for privately owned lands now being proposed by the Federal Government. The United States Forester, Colonel Henry S. Graves, is expected to be present to give the views of the Forest Service on this important question, while leading men in other lines will be asked to present the subject from the points of view of the State, the lumberman and the local landowner.

On the second day a more general program will be carried out, consisting of discussions upon such subjects as the acquisition by the Federal Government of forest lands for the production of timber, as well as for the protection of streams; state forestry organizations and policies; forest fire prevention; the relation of grazing to timber production on non-agricultural lands; the future of the naval stores industry, etc. The program for the third day has not yet been outlined, but it will probably be given over to sectional meetings, or to field excursions, or both. There will be fewer set speeches than is usual at such meetings, because it is planned to develop free discussion amongst the delegates in attendance. The various forestry and lumbering associations, landowners' associations and manufacturers' associations interested in timber production and in the proper development of Southern lands are being asked to co-operate in this meeting, which it is expected will be one of the most important ever held in the South.

Colonel Joseph Hyde Pratt, Director of the North Carolina Geological and Economic Survey, Chapel Hill, N. C., is now president of the Congress, and Mr. J. S. Holmes, State Forester, Chapel Hill, is secretary. Mr. R. D. Forbes, Superintendent of Forestry, Louisiana Department of Conservation, New Orleans, has kindly consented to act as assistant secretary, and will attend to all local arrangements. It is hoped that all the Southern States will be fully represented at this Congress.

NEW FIRM OF FORESTERS

WILLIAM L. HALL has resigned his position as Assistant Forester in the United States Forest Service to head the

THE WEEKS LAW POLICY

REPRESENTATIVE Zebulon Weaver has introduced a bill (H. R. 10372) into Congress asking for an appropriation of two million dollars a year for the next five years "to be expended under the act of March 1, 1911" (the Weeks Law), for the purchase of forest lands in the White Mountains of New England and the Southern Appalachians, with the avowed purpose of protecting the headwaters of our larger streams.

This is not a new policy, but is a continuation of a policy endorsed by Congress a number of times. The purchases began in 1911 with an appropriation of two million dollars a year for five years. As three million dollars of this was allowed to lapse, it was re-appropriated by Congress two or three years ago. Last year this policy was again endorsed, but only \$600,000 was appropriated, owing to the exceptional conditions due to the war.

The demand is now being made to put this policy on a more business-like basis by again making the expenditures cover a period of years. This has two very distinct advantages. It allows the government to compete with other possible purchasers, by allowing them to know that they will have a definite amount to spend for the next several years. It also enables the Forest Service, which is engaged in the

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Fifth edition, 1919, revised and enlarged, 756 pages, \$2.00. Circulars and sample pages. PORTER E. SARGENT, 14 Beacon Street, Boston, Mass.



firm of Hall, Kellogg & Company, with offices in the Otis Building, Chicago. The firm is to deal in timberlands and forest products, make forest surveys and to develop timberland investments. Mr. Hall was with the Forest Service for twenty years. His first undertaking was the formation and organization of a definite plan for timber planting operations for the Government and assistance to private owners who desired to grow timber. After putting this work upon a sound and practical basis, Mr. Hall was next asked to develop the branch of Forest Production in the Forest Service, with which he was connected for a long time and during which period the present widely known researches and investigations in timber testing, timber treating, and pulp and paper making were planned and culminated in the establishment of the Forest Products Laboratory at Madison, Wisconsin. For the past eight years Mr. Hall's energy has been devoted to the examination and recommendation for purchase by the National Government of 1,700,000 acres of timber and cut-over land in the White Mountains and Southern Appalachians, during which time he has gained an experience in timber examination, land classification, the handling of complicated land titles and the blocking up of holdings into suitable units for administration that is of a particularly unique and valuable character. During the war Mr. Hall was assigned to a conspicuous part in organization of the 20th Engineers, and at the close was a major in training for overseas service. Recently he has been making a survey of the wood-using industries of the Middle West for the purpose of determining their supply of raw material and the development of plans for a national forest policy, including the necessary part to be played therein by the Government, the timberland owners and the Public.

R. S. Kellogg, the other principal member of the firm, also began his professional and business career in the Forest Service, entering that organization in 1901 and continuing until 1910. During this period he had many important assignments covering all parts of the United States and Alaska. He made numerous forestry investigations in various parts of the country and brought out a large number of important publications. He had an exceedingly important part in the early conservation movement which focused the attention of the whole country upon the necessity of conserving supplies of timber and other natural resources. To Mr. Kellogg's efforts are due the plan of collecting annual statistics of forest products. The work was originally instituted by him and he wrote many of the earlier reports published by the Forest Service and the Bureau of the Census.

In 1910 Mr. Kellogg left a promising career in the public service to become Secretary of the Northern Hemlock and Hardwood Manufacturers' Association. Later

he became Secretary of the National Lumber Manufacturers' Association, and in 1918, Secretary-Treasurer of the Newsprint Service Bureau, with offices in New York. He will retain this position, his association with the new firm being in the capacity of stockholder and director.

VERSATILITY OF WOOD

A PAIR of green silken sox woven from fine fibers made from spruce and a coil of stout binder twine spun from twisted strands of fir are two of the typical products of western woods displayed on a panel just received in the office of the West Coast Lumbermen's Association in Seattle from the Forest Products laboratory at Madison, Wisconsin.

The exhibit has been arranged as a demonstration of the practical results obtained through the research work at the Madison laboratory and merely goes to illustrate once more and to emphasize that sawn and finished lumber is the crudest commercial product of the trees.

Among the other interesting specimen products included in the exhibit are: furniture reed and braid, used in making "wicker" furniture; paper rug yarn, extensively used in making bath-room mats and small household rugs; linoleum, with attractive patterns, made from wood flour and linseed oil; paper bagging that can be used in place of the jute bags now commonly employed in sacking grain; paper absorbent, which was quite generally used during the war as a successful substitute for absorbent cotton; artificial lath, produced from a mixture of wood flour and used as a substitute for wood lath; basket braid, made from twisted strands of paper; insulating rods and tubes, binder twine, paper cloth, glue tissue wrapping twine, paper webbing and rope, all produced from paper which in turn has been produced from native wood.


The basis for products such as phonograph records, insulating tubes and artificial lath is wood flour, which consists of spruce wood chemically treated and ground into a fine powder. The versatility of this flour is demonstrated by the fact that it is used in the peaceful art of making toys as well as in the more violent purpose of manufacturing dynamite. A case containing gunpowder made from wood flour is included in the exhibit.

Manufacture of clothing from artificial silk, produced from spruce, presents wonderful possibilities. The pair of sox on display is a mere example. A strip of silken cloth, tied with a silken cord—all made from spruce—show what can be done in this direction.

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FOREST FIRE AIR PATROL

DISTRICT 5, of the United States Forest Service, reported the following interesting data on the forest fire patrol, via the air, for the two months of July and August: 745 flights, 92,605 miles of flight, 8 planes daily in service, 16,000,000 acres national forest land covered twice daily, 5,000,000 acres private timber covered twice daily, 6 forced landings, 1 fatality.

In addition to the above terse figures, the District Forester reports the system as 85 per cent efficient in discovery of fires, but amends this by stating that it will shortly be practically 100 per cent efficient. Equipping the planes with wireless telephones will largely assist in reaching this state of perfection.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 800, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 800, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 800, care of American Forestry Magazine, Washington, D. C. (9-11)

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 810, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

A CHRISTMAS SUGGESTION

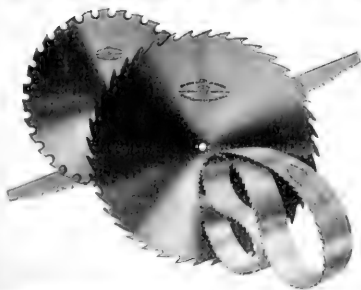
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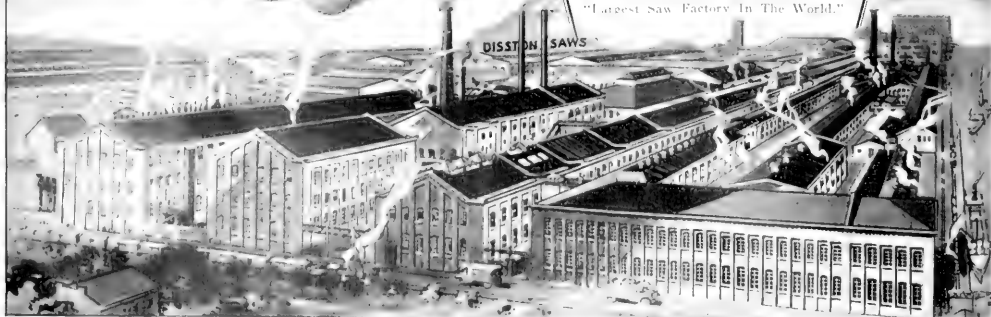
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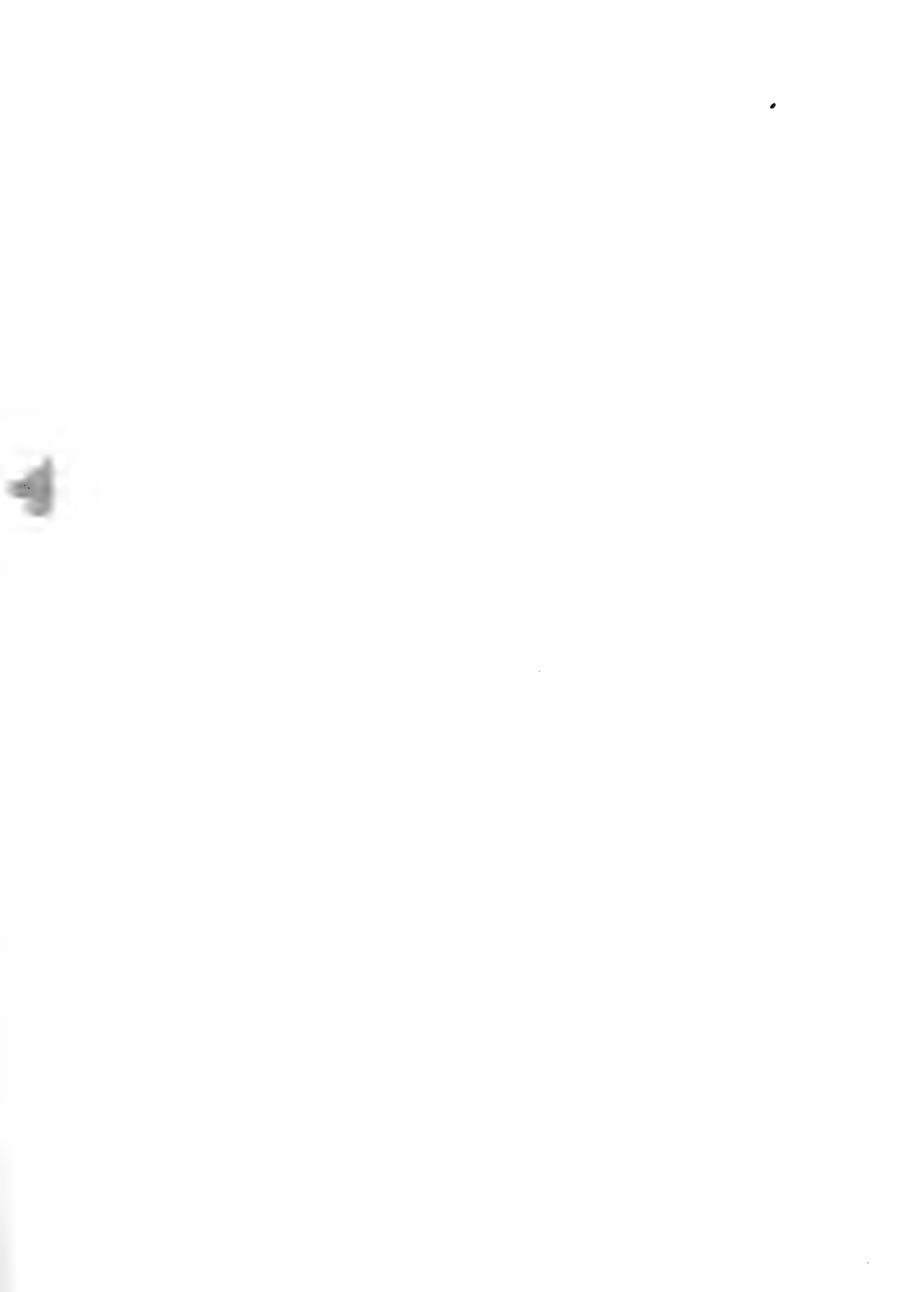
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